

**KEY TO SELECTED PYRALOIDEA (LEPIDOPTERA) LARVAE
INTERCEPTED AT U.S. PORTS OF ENTRY: REVISION OF PYRALOIDEA IN
"KEYS TO SOME FREQUENTLY INTERCEPTED LEPIDOPTEROUS
LARVAE" BY D. M. WEISMAN 1986**

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Abstract.—A key to frequently intercepted lepidopterous larvae, designed for U.S. Department of Agriculture, Animal and Plant Health Inspection Service (USDA, APHIS) identifiers at U.S. ports, was last revised in 1986. Since then many changes have occurred in the classification, nomenclature, and the nature of commodities being imported into the U.S. In this revision of the section on Pyraloidea, species recently intercepted are included, the most recent generic combinations are used, and families and subfamilies are now included in the key. Distributions are updated, stating if the species occurs in Hawaii or restricted areas of the continental United States. A "Note" section explains changes and additions, and gives references to further information. Two tables are provided, one to the classification of Pyraloidea with reference to placement in the key and another to the hosts and/or commodities.

Key Words: continental United States, Florida, Hawaii, hosts, Pyralidae, Crambidae

The Pyraloidea is estimated to be the second largest superfamily in the Lepidoptera, with more than 16,000 described species worldwide. Pyraloid caterpillars are very diverse in what they eat: "they consume dried or decaying plant or animal matter, wax in bee and wasp nests, and living plants. Some are known to be inquilines in ant nests (some Galleriinae), predators of scale insects (some Phycitinae), and aquatic scavengers in flowing water (some Nymphulinae) (Solis 1997). The plant feeders can be leaf rollers, leaf tiers, leafminers, and stem borers, and sometimes a combination. Pyraloid caterpillars are pests that cause damage and economically affect crops such as rice, sugarcane, corn, tomatoes, and many more; some are worldwide pests of stored products such as grains and fruits (Solis 1996).

Because so many pyraloid caterpillars are intercepted at ports in commodities being imported into the United States, the Pyraloidea part of "Keys for the identification of some lepidopterous larvae frequently intercepted at quarantine" by Hahn W. Capps, Division of Insect Identification, Bureau of Entomology and Plant Quarantine, U.S. Department of Agriculture was first published in 1939. It was published again in Spanish (Capps 1955) by the Agriculture Department of Mexico and again in English (Capps 1956, 1963) with only nomenclatural revision. It was not significantly revised again until 1986, when D. M. Weisman published "Keys for the identification of some frequently intercepted lepidopterous larvae." He added 40 species and replaced the Heinrich (1916) system of setal

nomenclature with the Hinton (1946) system. The revision presented here adds new taxa, incorporates recent new combinations, and provides keys to the family and subfamily levels of Pyraloidea. This revision also updates distributions, stating if taxa occur in restricted areas of the continental U.S. and Hawaii. A "Note" section explains changes and additions, adds relevant information, and gives references to further information. Two tables provide host and classification information.

The Pyraloidea has undergone both phylogenetic and nomenclatural changes because it is a group where taxonomists are actively pursuing questions that have both theoretical and applied ramifications. In the 1980's, Minet published a series of morphological papers on the tympanal organs in the Lepidoptera, including the Pyraloidea (1982). Based on the morphologically distinct tympanal organs and the work on larvae by Hasenfuss (1960), Minet proposed elevating two groups, known in the informal sense as Pyraliformes and Crambiformes (Munroe 1972), to Pyralidae and Crambidae. Most workers in the Pyraloidea agree with Minet (e.g., Munroe 1989, Solis and Mitter 1992). Taxonomy is not a static field but a field where new morphological and biological information continually becomes available, and it is necessary to change the classification to reflect this new information. In addition, several major checklists (Munroe et al. 1995, Shaffer et al. 1996) from several major geographic areas have been published in the last ten years with many new combinations and synonyms. Table 1 gives the current classification of Pyraloidea as an alphabetical list of the taxa treated in this work in the two families by subfamily, with the number of the couplet where they are found in the key for quick retrieval.

DESCRIPTION OF THE KEY AND ITS COMPONENTS

Capps' (1939) description of the function and basis of his key is still applicable today:

"The following keys are intended to assist quarantine inspectors in recognizing the lepidopterous larvae most frequently intercepted at ports of entry and are based on the differential characters noted in the literature, and on the larval collection and host catalogue in the United States National Museum." The title of this revision reflects a change from "most frequently" taxa intercepted to "selected" taxa intercepted. I retained all taxa included in Weisman's key even though the species may no longer be intercepted frequently; this is in part because the species intercepted depend on the commodities being imported into the U.S. and these species may again be intercepted in the future. The addition of species to this current key is based on the actual interceptions submitted by APHIS port identifiers. Specimens are submitted for identification until the port identifier receives "port authority" for the identification of particular species; with this authority, they no longer send specimens for verification of that species. The top twelve species sent to the SEL (Systematic Entomology Laboratory) for identification in order from more frequent to less frequent during 1998 are: *Ectomyelois ceratoniae*, *Cadra cautella*, *Leucinodes orbonalis*, *Diatraea considerata*, *Spoladea recurvalis*, *Neoleucinodes elegantalis*, *Etiella zinckenella*, *Congethes* sp., *Pyrausta* sp., *Phidotricha erigens*, *Plodia interpunctella*.

Capps (1939) also wrote: "In using the keys, it should be borne in mind that their validity is dependent on three factors, viz., (1) structure, (2) origin, and (3) host." The origin referred to by Capps indicates the country where the commodity supposedly originated and does not imply evolutionary origin; for this reason Weisman (1986) probably chose to use the term "distribution" rather than "origin." The origin documented by port identifiers is the origin of the vehicle transporting the commodity prior to entering the U.S. The point of origin of the insect could be several ports removed if the vehicle made multiple stops, or en-

Table 1. Classification of Pyraloidea (number refers to couplet in the key).

PYRALOIDEA	SCHOENOBIINAE – 28
CRAMBIDAE	PYRALIDAE – 1
CRAMBINAE	CHRYSAUGINAE – 22
<i>Chilo suppressalis</i> (Walker) – 31	EIPASCHIINAE
<i>Diatrea</i> sp. – 31	<i>Phidotricha erigens</i> (Ragonot) – 19
<i>Eoreuma loftini</i> (Dyar) – 30	GALLERIINAE
EVERGESTINAE	<i>Alpheias conspirata</i> Heinrich – 24
<i>Evergestis rimosalis</i> (Guenée) – 37	<i>Corcyra cephalonica</i> (Stainton) – 26
GLAPHYRIINAE	<i>Paralipsa gularis</i> (Zeller) – 26
<i>Hellula rogatalis</i> (Hulst) – 39	<i>Genopaschia protomis</i> Dyar – 24
<i>Hellula phidilealis</i> (Walker) – 39	<i>Trachylepidia fructicassella</i> Ragonot – 25
NYMPHULINAE	PHYCITINAE
<i>Parapoynx diminutalis</i> Snellen – 27	<i>Amyelois traustilla</i> (Walker) – 13
PYRAUSTINAE	<i>Ancylostomia stercorea</i> (Zeller) – 8
<i>Achyra rantalis</i> (Guenée) – 41	<i>Cadra cautella</i> (Walker) – 17
<i>Ostrinia nubilalis</i> (Hübner) – 36	<i>Cadra figulilella</i> (Gregson) – 18
<i>Pyrausta</i> sp. – 33	<i>Cadra calidella</i> (Guenée) – 18
SPILOMELINI (or SPILOMELINAE)	<i>Cryptoblades</i> sp. – 6
<i>Conogethes</i> spp. – 34	<i>Ectomyelois ceratoniae</i> (Zeller) – 13
<i>Diaphania nitidalis</i> (Stoll) – 49	<i>Elasmopalpus lignosellus</i> (Zeller) – 6
<i>Diaphania indica</i> complex – 49	<i>Ephestia elutella</i> (Hübner) – 16
<i>Hendecasis duplifascialis</i> Hampson – 47	<i>Ephestia kuehniella</i> (Zeller) – 16
<i>Herpetogramma bipunctalis</i> (Fabricius) – 43	<i>Etiella zinckenella</i> (Treitschke) – 20
<i>Leucinodes orbonalis</i> (Guenée) – 50	<i>Fundella pellucens</i> Zeller – 10
<i>Lineodes integra</i> (Zeller) – 46	<i>Homoeosoma electellum</i> Hulst – 11
<i>Loxomorpha flavidissimalis</i> Grote – 41	<i>Hypsipyla</i> sp. – 9
<i>Maruca vitrata</i> (Fabricius) – 35	<i>Moodna bisinuella</i> Hampson – 9
<i>Megastes</i> sp. – 35	<i>Mussidia nigrivenella</i> Ragonot – 4
<i>Neoleucinodes elegantalis</i> (Guenée) – 50	<i>Plodia interpunctella</i> (Hübner) – 14
<i>Rhectocraspeda periusalis</i> (Walker) – 43	PYRALINAE
<i>Spoladea recurvalis</i> Fabricius – 45	<i>Pyralis farinalis</i> Linnaeus – 21
<i>Udea rubigalis</i> (Guenée) – 46	<i>Aglossa caprealis</i> (Hübner) – 21

tirely outside the vehicle's itinerary if infested cargo was transferred en route.

Further, Capps (1939) wrote: "Moreover, the characters used for separating the families are not completely diagnostic for the entire family but will serve to separate the species treated here." This is emphasized for two reasons: one, the percentage of lepidopterous larvae known is very small, usually only the larval morphology of the pest species in a genus is well known, and hence, the distribution of the characters across taxa are unknown; and two, the loss or reduction of characters in larvae in general is inferred to occur extensively (see also Passoa 1985).

All current taxonomic and phylogenetic information has been incorporated into the

revision of this key. Distributions vary according to the information provided with the submitted material and are based specifically on the usage by port identifiers; for example, a country versus an area of a continent. It is stated if the species occurs in Hawaii or a few states in the continental U.S. Changes in distribution in this revision are based on the current literature and unpublished localities in the Pyraloidea collection of the National Museum of Natural History, Smithsonian Institution, Washington, D.C. New records in the U.S. are taken into account if there is evidence to support that a population has been established. It is common in certain parts of the U.S. adjoining the Gulf of Mexico to catch one or more adult(s) of a species at light, but this is not

evidence that the species is established in the U.S. Specifically, distribution records from Hawaii are from Nishida (1992). He uses three words to reflect residency status: endemic, indigenous, and adventive. I use only adventive when applicable: "immigrant" is used in place of "introduced" to differentiate from those that were purposely introduced. Species that are known only from quarantine records (reported as intercepted) or those considered not established are present in the database, but do not appear in the checklist (Nishida 1992). The "Old World" includes all land masses except the Western Hemisphere.

The plant names are based primarily on the names given to commodities being imported or brought into the U.S. for any variety of purposes; in this work the biological term "host" and the economic term "commodity" are often one and the same. The names of hosts are either a scientific name or a common name as supplied by port identifiers and checked against Brako, Rossman, and Farr (1995) for U.S. names, and Mabberley (1997) for all other localities and are listed under the "Hosts" section of each species. In the key, the 1998 host records are directly from the SELIS database (Systematic Entomology Laboratory Identification Service) as submitted by port identifiers and listed alphabetically. Pre-1998 records can be from a variety of sources and are primarily those listed in Weisman (1986), with additions from the SELIS database, the USNM larval collection, and are mainly historical records. If the scientific name of a host appeared in both the 1998 list and pre-1998 list, it was removed from the pre-1998 list. The lists of hosts at times lack detail (e.g., "stored vegetable products") because many pyraloid pest species are highly polyphagous. Table 2 gives the hosts of the pyraloid larvae. If a scientific name for the commodity is given, the table refers to the common name as given by the port identifiers also; scientific names were not generally used prior to the mid-1980's. The common name is followed

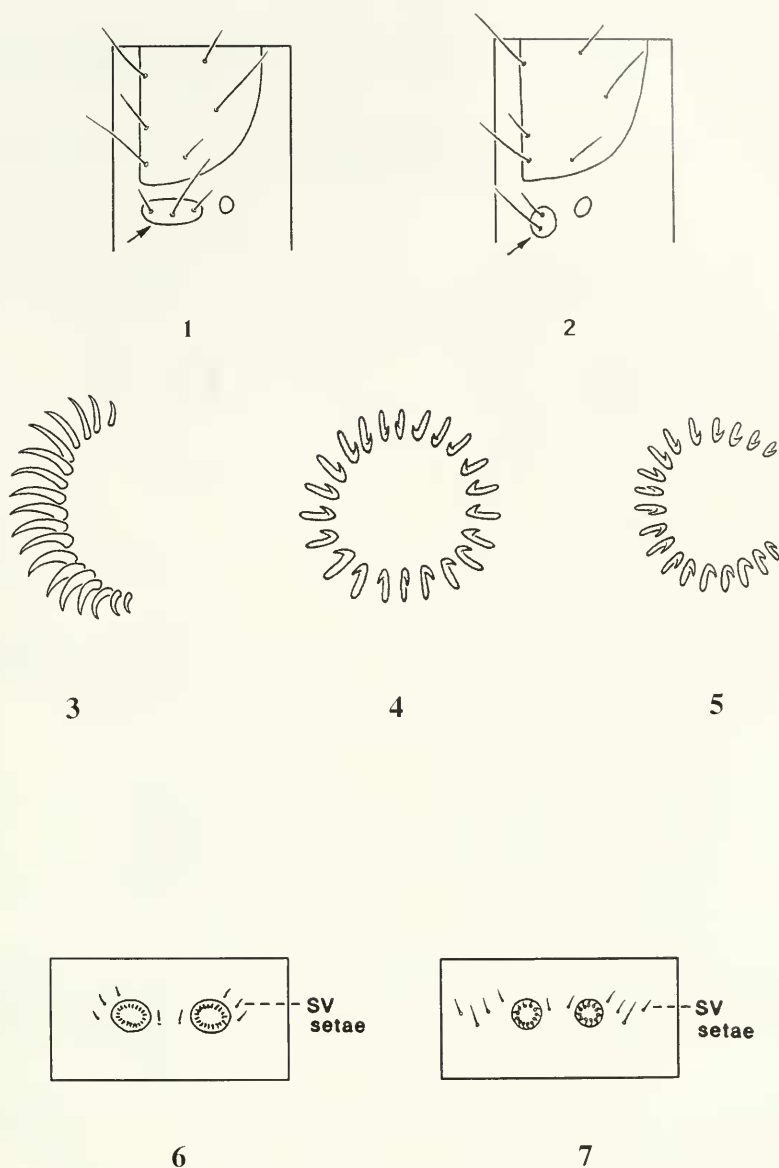
by the scientific name in brackets for purposes of cross-indexing.

The "Note" sections comment on a variety of topics that may be useful to the port identifier, it is not meant to be comprehensive: on character variability, explanations of recent nomenclatural changes, nomenclatural method of reporting based on morphological and distributional information available, and relevant literature. The amount of literature available is scattered and very large for pest species, and is less large for geographical works (e.g., Carter 1984, Mutuura et al. 1965). This work does not attempt to review the entirety of the literature, but rather to point to seminal literature that provides relevant information.

HOW TO DISTINGUISH PYRALOIDEA LARVAE

Pyraloidea larvae can be distinguished from other Lepidoptera larvae by a combination of characters. Many "micro" lepidopteran groups have 3 setae in the prespiracular group of the prothorax (Fig. 1), but some may have 2 or 1 (Stehr 1987) and they do not have typical pyraloid crochets (see below). Pyraloids, noctuids, and other "macro" lepidopteran groups have two setae in the prespiracular group of the prothorax (Fig. 2) (Stehr 1987). The Noctuoidea and Carposinidae, two groups that are intercepted frequently and are of importance to port identifiers, can be confused with pyraloids by the presence of two setae in the prothoracic prespiracular group. But pyraloids can be distinguished from noctuids because noctuids have the crochets in a mesoseries (Fig. 3), and pyraloids have the crochets in a complete circle or penellipse (Figs. 4–5).

Larvae of the Carposinidae are also confused with pyraloids because they also have two setae in the prespiracular group of the prothorax and crochets in a complete circle. Generally, pyraloids can be separated from carposinids because pyraloids have 3 subventral setae on abdominal segments 3 to 6 (Fig. 6), and carposinids usually have 4 subventral setae (Fig. 7), but the number of



Figs. 1-7. Characters to distinguish larvae of Pyraloidea (see text). 1-2, Prespiracular group of setae of prothorax (arrows). 3, Crochets in a mesoseriate. 4, Crochets in a complete circle. 5, Crochets in a penultimate. 6-7, Subventral (SV) setae on abdominal segment.

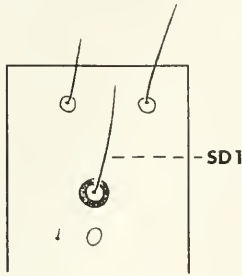
subventral setae may vary from segment to segment (see Common 1990). It should be noted here that Weisman (1986) used "the spiracle on abdominal segment 8 well above level of those on preceding segments" to separate them from pyraloids, but many pyraloids have the spiracle on

segment 8 above the level of those on the preceding segments.

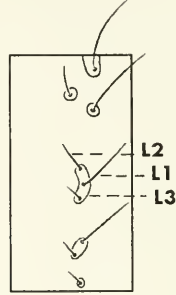
For recent, more general information on other Nearctic pyraloid larvae and lepidopterous larvae and comparisons to other families and other geographic regions see Stehr (1987) and Common (1990).

KEY TO SELECTED INTERCEPTED PYRALOIDEA LARVAE

1. Sclerotized ring around seta SD1 on A8 (missing in some phycitines) (Fig. 8); three (sometimes two) setae in the L group on A9 (Fig. 9) **Pyralidae** 2
- Subfamilies: Chrysauginae, Epipaschiinae, Galleriinae, Phycitinae, Pyralinae
- Note: Sclerotized rings sometimes hard to see and appear as shiny, unsclerotized rings; 2 L setae in *Etiella zinckenella* (Tr.) and others

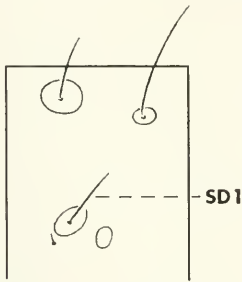


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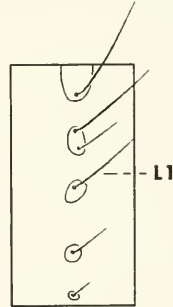


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- No sclerotized ring around seta SD1 on A8 (Fig. 10); one seta in the L group on A9 (Fig. 11) **Crambidae** 27
- Subfamilies: Cathariinae, Crambinae, Cybalomiinae, Evergestinae, Glaphyriinae (includes Dichogaminae), Linostinae, Midilinae, Musotiminae, Noordinae, Nymphulinae, Odontiinae, Pyraustinae (includes Spilomelinae), Schoenobiinae, Scopariinae, Wurthiinae

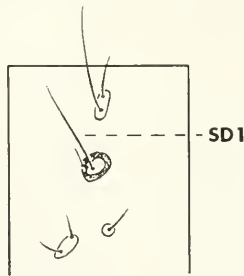


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2. Sclerotized ring around seta SD1 on mesothorax, metathorax, or A1 (Fig. 12) **Galleriinae, Chrysauginae, Phycitinae** 3
- Note: Sclerotized ring sometimes absent on these segments, but in taxa not covered in this key (Solis and Mitter 1992)



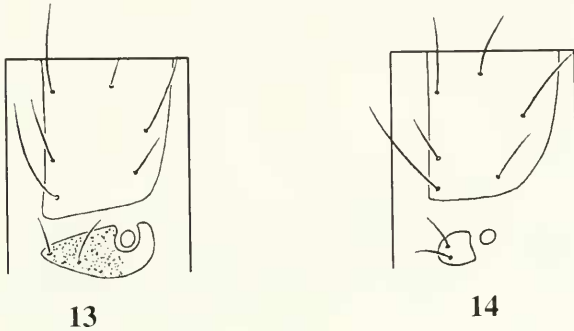
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- No sclerotized ring around seta SD1 on mesothorax, metathorax, or A1 *Pyralinae, Epipaschiinae, few Phycitinae* 19
- 3. Sclerotized ring around seta SD1 of metathorax or A1 *Chrysauginae, Galleriinae* 22
- Sclerotized ring around seta SD1 on mesothorax *most Phycitinae* 4
- 4. Sclerotized ring around seta SD1 on A2 to A7 *Mussidia uigrivenella* Ragonot

Distribution: west tropical Africa; does not occur in the U.S.
 Hosts: 1998: stored seeds
 pre-1998: butter beans, cacao, calabar beans, carob or locust bean, stored grains (cereals)
 Note: see Aitken 1963, Corbet and Tams 1943

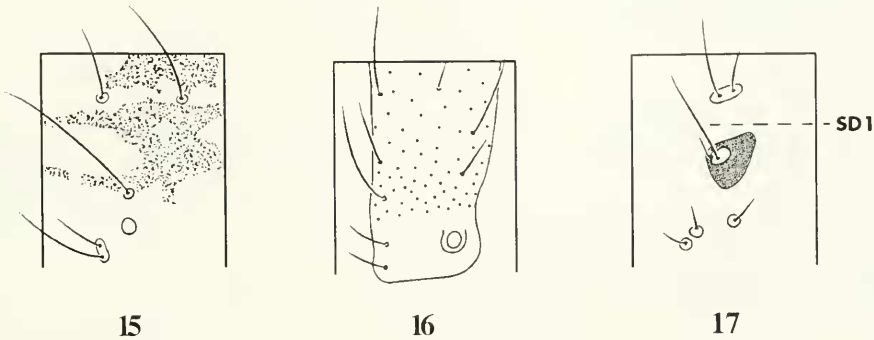
- Sclerotized ring around seta SD1 of mesothorax *other Phycitinae* 5
- Note: see Hinton 1943; some Phycitinae lack this character, e.g., *Etiella* sp.

- 5. Prespiracular shield of prothorax extending below and behind the spiracle (Fig. 13) or completely enclosing spiracle (Fig. 16) 6
- Prespiracular shield of prothorax never extending below and behind spiracle (Fig. 14) 7



- 6. Posterior portion of prespiracular shield weakly pigmented (Fig. 13); body pink with whitish discontinuous longitudinal bands on most segments (Fig. 15); ring around mesothoracic seta SD1 not prominently sclerotized (Fig. 12) *Elasmopalpus lignosellus* (Zeller)

Distribution: Western Hemisphere; adventive in Hawaii
 Hosts: 1998: *Ananas comosus, Asparagus officinalis, Coffea arabica, Corylus avellana, Maranta* sp., *Mentha* sp., *Mimosa pigra, Sida* sp., *Sorghum* sp., *Zea mays* (unpopped corn)
 pre-1998: alfalfa, beans, cow peas, Johnson grass, peas, soybeans, strawberries, string beans, sugarcane
 Note: see Heinrich 1956, Luginbill and Ainslie 1917, Neunzig 1979



- Prespiracular shield completely enclosing spiracle weakly pigmented (Fig. 16); prominent longitudinal dark bands on all segments; ring around mesothoracic seta SD1 prominently sclerotized (Fig. 17) *Cryptoblabes* sp.

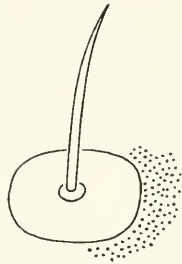
Distribution: Europe, Africa, Asia

Hosts: 1998: *Citrus sinensis*, *Dimocarpus longan*, *Musa* sp., *Phoenix* sp., *Psidium guajava*, *Punica granatum*

pre-1998: *Amaranthus* sp., *Chaenomeles japonica*, grapes, *Lythrum* sp., pineapple, raisins, *Tamarix* sp.

Note: should be reported as "*Cryptoblabes guidella* (Millière)" if the origin is from the Western Hemisphere where it was introduced (Heinrich 1956); does not occur in the continental U.S. or Hawaii; see Neunzig 1986

- 7. Integument granulose under low magnification (30×) (Fig. 18) 8



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- Integument not granulose under low magnification 10

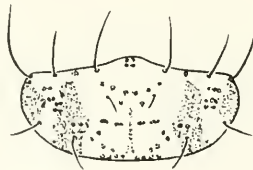
- 8. Prothoracic shield with black areas on lateral margins and longitudinal black areas on either side midway between center line and lateral margins (black areas on either side of center line may be very faint) (Fig. 19) *Ancylostomia stercorea* (Zeller)

Distribution: tropical Western Hemisphere including southeastern U.S., Florida to Texas

Hosts: 1998: *Cajanus cajanus*, *Phaseolus vulgaris*, *Pisum sativum*, *Rumex* sp.

pre-1998: chickpeas, cow peas

Note: see Heinrich 1956



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- Prothoracic shield not with the above color pattern 9

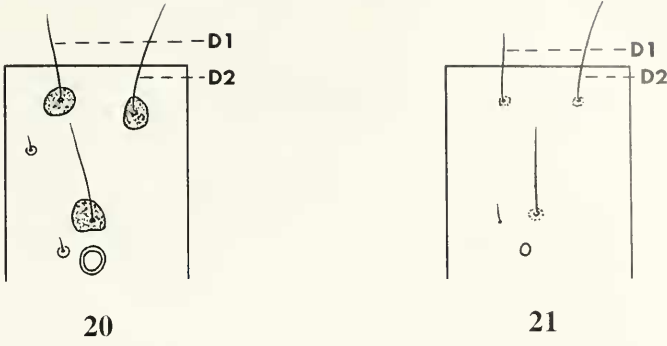
- 9. Pinacula of body setae large and dark (Fig. 20); seta D2 of A1 to A7 below level of seta D1 (Fig. 20) *Hypsipyla* sp.

Distribution: tropical Western Hemisphere including southern Florida

Hosts: 1998: *Zea mays* (unpopped corn)

pre-1998: crabwood, mahogany, Spanish cedar logs

Note: see Heinrich 1956, Neunzig 1990

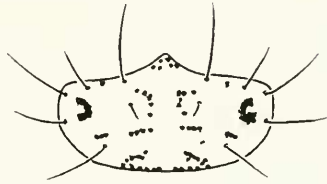


- Pinacula of body setae very small and pale (Fig. 21); seta D2 of A1 to A7 at level of seta D1 (Fig. 21) *Moodna bisinuella* Hampson

Distribution: southern Texas to Mexico, El Salvador
 Hosts: *Zea mays*
 Note: see Heinrich 1956, Neunzig 1990

- 10. Prothoracic shield yellow with pattern of dark marks as illustrated (Fig. 22) . . . *Fundella pellucens* Zeller

Distribution: tropical Western Hemisphere including Florida
 Hosts: 1998: *Cajanus cajan*
 pre-1998: beans, cow peas, lima beans, peas
 Note: see Heinrich 1956

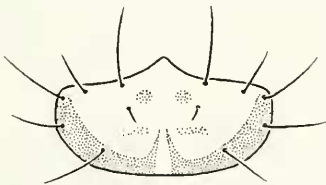


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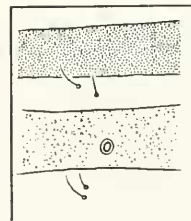
- Prothoracic shield yellowish without the pattern as above 11

- 11. Prothoracic shield with black areas on lateral and posterior margins (sometimes without black area on posterior margin) (Fig. 23); prominent longitudinal dark bands on all segments (Fig. 24); head with dark band from ocelli to posterior margin *Homoeosoma electellum* Hulst

Distribution: North and South America
 Hosts: 1998: *Bidens* sp., *Helianthus annuus*
 pre-1998: Asteraceae, cotton, oranges
 Note: see Heinrich 1956, Neunzig 1997

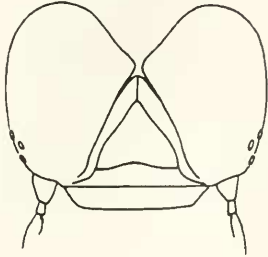


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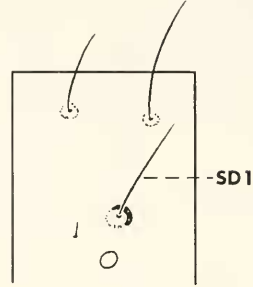


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- Prothoracic shield yellowish without the pattern as in Fig. 23 12
- 12. Coronal suture absent (Fig. 25); A1 to A7 with a crescent-shaped patch above seta SD1 (usually reduced to a small smudge or missing in *Amyelois transitella*) (Fig. 26) 13

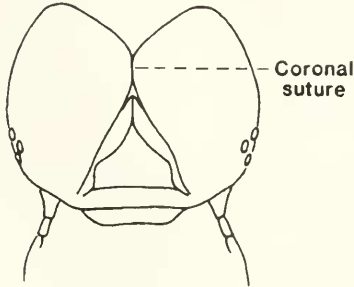


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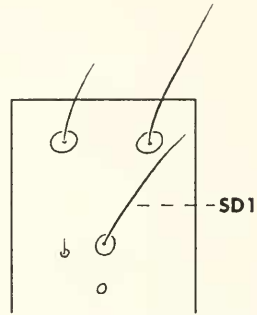


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- Coronal suture present (Fig. 27); A1 to A7 without crescent-shaped patch above seta SD1 (Fig. 28) 14



27



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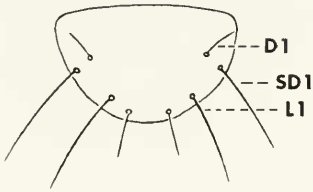
- 13. Anal plate with seta SD1 closer to seta D1 than to seta L1 (Fig. 29); seta SD2 of A8 usually separated from the spiracle by 2 or more times the diameter of the spiracle (Fig. 30); sclerotized ring around seta SD1 on A8 usually complete (Fig. 30) *Ectomyelois ceratoniae* (Zeller)

Distribution: nearly cosmopolitan including Florida

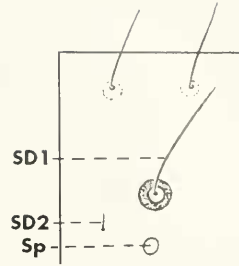
Hosts: 1998: *Ammonia* sp., *Capsicum* sp., *Castanea sativa*, *Cereus* sp., *Chimonanthus* sp., *Cucurbita* sp., *Cydonia oblonga*, *Ficus carica*, *Juglans nigra*, *Lansium domesticum*, *Malus sylvestris*, *Mangifera indica*, *Phaseolus* sp., *Phoenix dactylifera*, *Pithecellobium dulce*, *Prunus avium*, *Psidium guajava*, *Pyrus communis*, *Pyrus pyriflora*, *Punica granatum*, *Sesbania* sp., *Tamarindus indica*, *Zea mays*

pre-1998: carob or locust bean, dates, legumes, nuts, and others

Note: If the origin is from the tropical areas of the Western Hemisphere it should be reported as "probably *E. decolor*"; see Neunzig 1979, 1990



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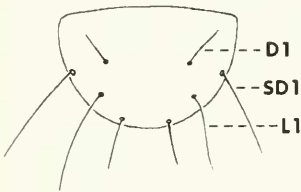
- Anal plate with seta SD1 equidistant from setae D1 and L1 (Fig. 31); seta SD2 of A8 usually separated from the spiracle by one to 1.5 times the diameter of the spiracle (Fig. 32); sclerotized ring around seta SD1 on A8 incomplete (Fig. 32) *Anyelois transtilla* (Walker)

Distribution: tropical Western Hemisphere including southern U.S.

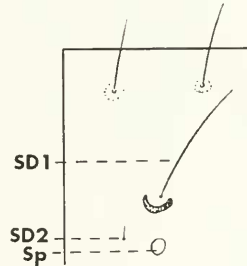
Hosts: 1998: none

pre-1998: *Annona* sp., *Caesalpinia pulcherrima*, *Cajanus cajan*, *Citrus sinensis*, *Cydonia oblonga*, *Juglans* sp., *Malus* sp., *Malus sylvestris*, *Mangifera indica*, peach, peony, *Punica granatum*, *Pyrus communis*, *Randia* sp., *Tamarindus indica*, *Zea mays*, and other fruits and pods

Note: see Neunzig 1990



31



32

- 14. A1 to A8 apparently without pinacula (pinacula concolorous with body and not evident) (Fig. 33) *Plodia interpunctella* (Hübner)

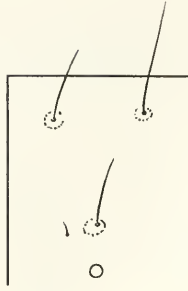
Distribution: cosmopolitan, adventive in Hawaii

Hosts: 1998: *Berberis* sp., *Camellia sinensis*, *Capsicum* sp., *Capsicum annuum*, *Castanea sativa*, *Cicer arietinum*, *Ficus carica*, *Gleditsia* sp., *Morus* sp., *Oryza* sp., *Phaseolus* sp., *Pistacia* sp., Poaceae, *Prosopis* sp., *Prunus avium*, *Prunus domestica*, *Prunus persica*, *Punica granatum*, *Vicia faba*, *Vitis* sp., *Ziziphus jujuba*

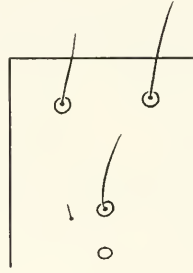
pre-1998: stored fruit, grain, and vegetable products

Note: see Neunzig 1990

- A1 to A8 with small pigmented pinacula (Fig. 34) 15

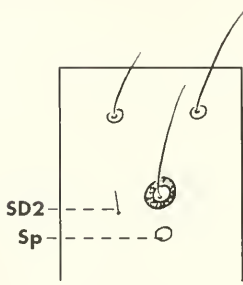


33

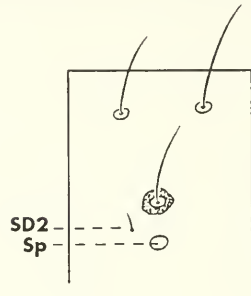


34

- 15. A8 with seta SD2 separated from spiracle by 2 to 3 times the horizontal diameter of the spiracle (Fig. 35) 16
- A8 with seta SD2 separated from spiracle by a distance equal to the horizontal diameter of the spiracle (Fig. 36) 17



35



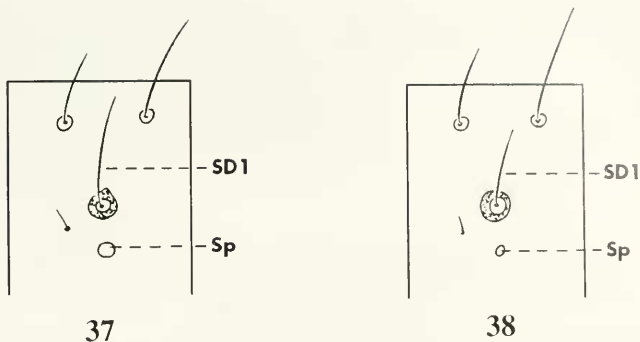
36

- 16. Spiracle of A8 as large as the area enclosed by the sclerotized ring around seta SD1 (Fig. 37) *Ephestia kuehniella* (Zeller)

Distribution: nearly cosmopolitan; does not occur in Hawaii
 Hosts: 1998: *Annona* sp., *Dennettia* sp., *Chrysophyllum* sp., *Moringa oleifera*
 pre-1998: stored grain, stored and dried vegetable products
 Note: see Neunzig 1990

- Spiracle of A8 two-thirds or less as broad as the area enclosed by the sclerotized ring around seta SD1 (Fig. 38) *Ephestia elutella* (Hübner)

Distribution: Nearly cosmopolitan; does not occur in Hawaii
 Hosts: 1998: *Acanthocereus* sp., *Allium* sp., *Brassica* sp., *Capsicum* sp., *Castanea* sp., cereal products, *Juglans nigra*, *Medicago sativa*, *Oryza sativa*, *Protea* sp., *Prunus* sp., *Prunus avium*, *Punica granatum*, *Vitis* sp.
 pre-1998: stored and dried vegetable products
 Note: see Neunzig 1990; early instars with partial sclerotization of SD1 ring A1 to A7



17. Seta D2 of A1 to A8, two to two and one-half times the length of seta D1 (Fig. 39) *Cadra cautella* (Walker)

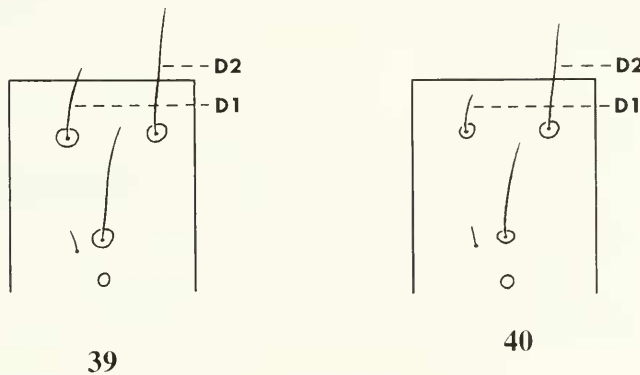
Distribution: cosmopolitan, adventive in Hawaii

Hosts: 1998: *Allium sativum*, *Anacardium* sp., *Ananas comosus*, *Arachis hypogaea*, *Areca* sp., *Bambusa* sp., *Berberis* sp., *Capsicum* sp., *Carica papaya*, *Citrus* sp., *Coffea arabica*, *Cucurbita* sp., *Guizotia abyssinica*, *Morus* sp., *Oryza sativa*, *Phaseolus* sp., *Phoenix dactylifera*, *Pisum sativum*, *Pithecellobium dulce*, *Prunus avium*, *Psidium guajava*, *Pyrus communis*, *Rosa* sp., *Rubus* sp., *Sesamum indicum*, *Tamarindus* sp., *Theobroma cacao*, *Vaccinium* sp., *Zea mays*

pre-1998: stored and dried vegetable products

Note: see Neunzig 1990

- Seta D2 of A1 to A8, three to five times the length of seta D1 (Fig. 40) 18



18. Metathorax with the distance between setae VI 2 times or less than the distance between seta VI and the coxa (Fig. 41) *Cadra figulilella* (Gregson)

Distribution: nearly cosmopolitan; occurring in the continental U.S. and adventive in Hawaii

Hosts: 1998: *Allium sativum*, *Capsicum* sp., *Castanea sativa*, *Ficus* sp., *Ficus carica*, *Manihot esculenta*, *Morus* sp., *Phoenix dactylifera*, *Prunus* sp., *Prunus avium*, *Psidium guajava*, *Saccharum officinarum*

pre-1998: dried beans, fruits, nuts, and seeds

Note: see Neunzig 1990

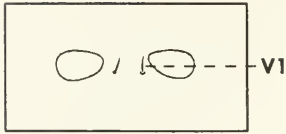
- Metathorax with the distance between setae VI 3 to 5 times the distance between seta VI and the coxa (Fig. 42) *Cadra calidella* (Guenée)

Distribution: Mediterranean; does not occur in the U.S

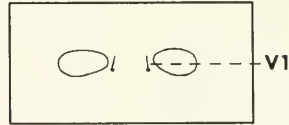
Hosts: 1998: *Castanea* sp., *Ceratonia siliqua*, dried foodstuffs, *Ficus* sp., *Ficus carica*, *Morus* sp., *Phoenix* sp., *Prunus* sp.

pre-1998: dried fruit and nuts, *Plectranthus* sp. (seed), *Vitis vinifera*

Note: see Aitken 1963

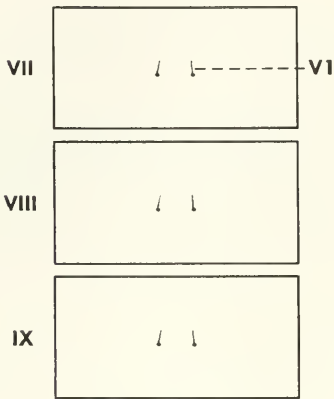


41

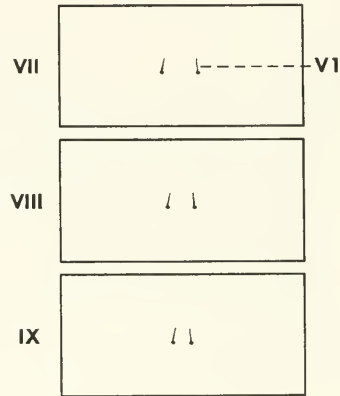


42

19. V1 on abdominal segment 7 as far apart as on segment 9 (Fig. 43); body without longitudinal dark bands **Phycitinae, Pyralinae** 20



43



44

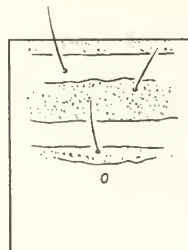
- V1 on abdominal segment 7 twice as far apart as on segment 9 (Fig. 44); body with longitudinal dark bands (Fig. 45) **Epipaschiinae, *Phidotricha erigens*** (Ragonot)

Distribution: tropical Western Hemisphere including southern Florida

Hosts: 1998: *Benincasa hispida*, *Mammea* sp., *Mimosa pigra*, *Petiveria alliacea*, *Zea mays*, *Zingiber* sp.

pre-1998: cotton, lima beans, loquats, mangos, sorghum, tamarinds

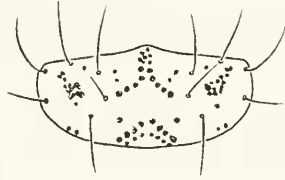
Note: misidentified in the literature as *Pococera atramentalis* Lederer (Solis 1993); see Allyson 1977



45

20. Prothoracic shield with pattern of dark markings as illustrated (Fig. 46); from the Western Hemisphere **Phycitinae, *Etiella zinckenella*** (Treitschke)

Distribution: nearly cosmopolitan; does not occur in Hawaii
 Hosts: 1998: *Cajanus cajan*, *Capsicum annuum*, *Castanea sativa*, *Cicer arietinum*, *Cucurbita* sp., *Cydonia oblonga*, *Lablab purpureus*, *Opuntia* sp., *Parkia* sp., *Phaseolus lunatus*, *Phaseolus vulgaris*, *Pisum sativum*, *Solanum tuberosum*, *Zea mays*
 pre-1998: legumes and other stored vegetable products
 Note: because several immatures of species are indistinguishable, it should be reported as "*Etiella* sp." if the origin is southeast Asia; markings on prothorax can be more or less distinct

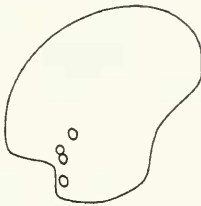


46

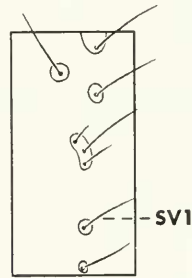
- Prothoracic shield not patterned as above 21

21. Head with only 4 distinct ocelli (ocelli I and II fused and ocellus VI usually missing) (Fig. 47); A9 with one subventral seta (Fig. 48) *Pyralis farinalis* Linnaeus

Distribution: nearly cosmopolitan, does not occur in Hawaii
 Hosts: 1998: *Allium* sp., foodstuffs, *Narcissus tazetta*, packing
 pre-1998: dried vegetable products
 Note: the packing is usually associated with polished monuments, marble blocks, and tiles in wood crates



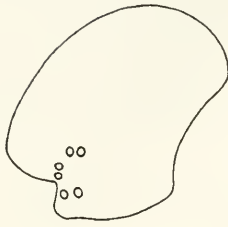
47



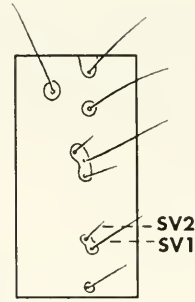
48

- Head with 6 ocelli (Fig. 49); A9 with two subventral setae (Fig. 50) *Aglossa caprealis* (Hübner)

Distribution: Nearly cosmopolitan, does not occur in Hawaii
 Hosts: 1998: *Allium sativum*
 pre-1998: damp grain and rotting vegetable matter, *Nephelium lappaceum*, packing in crates, *Persea americana*

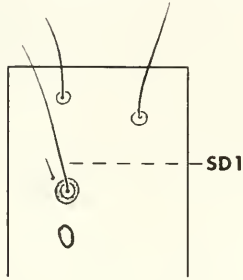


49

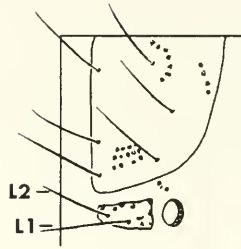


50

22. Sclerotized ring around seta SD1 of metathorax (Fig. 51) **Chrysauginae**
 - Sclerotized ring around seta SD1 of A1 (Fig. 51) **Galleriinae** 23

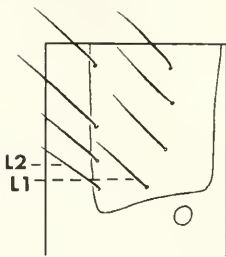


51

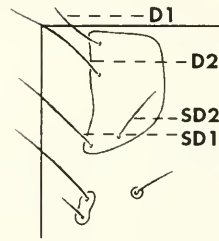


52

23. Prespiracular and prothoracic shields entirely fused (Fig. 53) 24
 - Prespiracular and prothoracic shields not fused (Fig. 54) 25



53



54

24. Sclerotized rings around seta SD1 on A2 to A7 in addition to A1 and A8 ... *Alpheias conspirata* Heinrich

Distribution: Mexico

Hosts: *Ananas comosus*

- No sclerotized rings around seta SD1 on A2 to A7; sclerotized rings around A1 and A8 only *Genopaschia protomis* Dyar

Distribution: Panama
 Hosts: *Ananas comosus*

25. Prespiracular shield of prothorax not extending below and behind spiracle (Fig. 52) 26
 – Prespiracular shield of prothorax extending below and behind the spiracle (Fig. 55)
 *Trachylepidia fructicassella* Ragonot

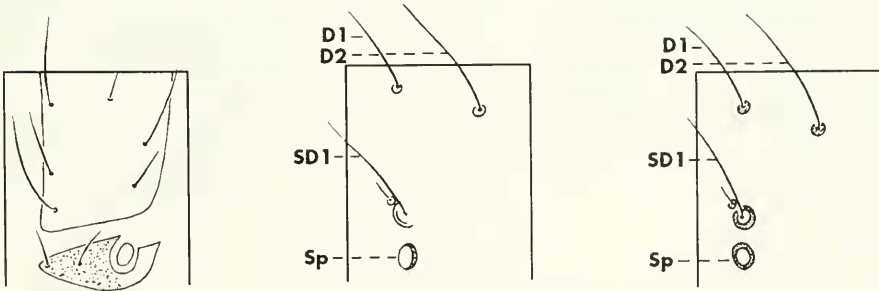
Distribution: pantropical
 Hosts: 1998: *Cassia* sp., *Cassia fistula*, *Cassia grandis*, dried vegetable products, *Vigna* sp.
 pre-1998: *Inga*

26. Sclerotized ring around seta SD1 on A1 and A8 not complete (Fig. 56); spiracular peritreme thicker on caudal margin (Fig. 56); pinacula of setae D1 and D2 on abdominal segments not pigmented (Fig. 56)
 *Corecra cephalonica* (Stainton)

Distribution: cosmopolitan
 Hosts: 1998: *Brassica* sp., *Guazuma ulmifolia*, *Lens* sp., *Oryza* sp., *Oryza sativa*, *Triticum* sp.
 pre-1998: *Abelmoschus esculentus*, *Acacia* sp., *Arachis* sp., *Cassia* sp., cocoa beans, coffee, *Cola* sp., *Cuminum* sp., *Inga* sp., *Phaseolus vulgaris*, *Sesamum indicum*, *Sorghum* sp., stored vegetable products

- Sclerotized rings around seta SD1 on A1 and A8 complete (Fig. 57); spiracular peritremes of uniform thickness (Fig. 57); pinacula of setae D1 and D2 on abdominal segments pigmented (Fig. 57)
 *Paralipsa gularis* (Zeller)

Distribution: nearly cosmopolitan, adventive in Hawaii
 Hosts: 1998: *Capsicum annuum*, *Nephetium lappaceum*, *Phoenix dactylifera*, *Rhododendron* sp., *Zea mays*
 pre-1998: *Ananas comosus*, *Areca catechu*, *Bambusa* sp., *Calophyllum brasiliense*, *Cassia* sp., *Castanea* sp., *Ceratonia siliqua*, dunnage, *Elasis* sp., *Lansium domestica*, *Oncidium* sp., papyrus, *Punica granatum*, *Solanum* sp., *Stirlingia* sp., stored vegetable products



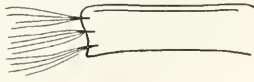
55

56

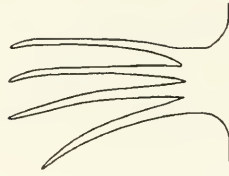
57

27. Lateral gills on body segments (Figs. 58, 59) **Nymphulinae** *Parapouyx* sp.

Distribution: southeastern Asia, Africa, Australia, Europe, U.S.
 Hosts: 1998: *Hygrophila* sp., *Vallisneria* sp.
 pre-1998: *Cabomba* sp., *Hydrilla* sp., *Limnoplila* sp., *Myriophyllum* sp.
 Note: Fig. 59 is an enlargement of one lateral gill, note base; *P. fluctuosalis* is adventive in Hawaii; see Goater 1986

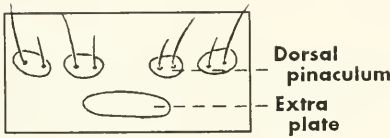


58

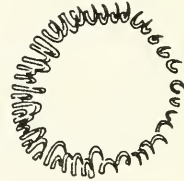


59

- Without lateral gills 28
- 28. With membranous sac or gibbosity anterior to prothoracic coxae **Schoenobiinae**
 Hosts: 1998: *Typha latifolia*
 pre-1998: *Pistia stratiotes*
 Note: for further information on this group see Passoa (1987) and Stehr (1987)
- Without membranous sac or gibbosity anterior to prothoracic coxa 29
- 29. A single transverse plate posterior to dorsal pinacula on mesothorax (Fig. 60); crochets in complete circle (Fig. 61) **Crambinae** 30

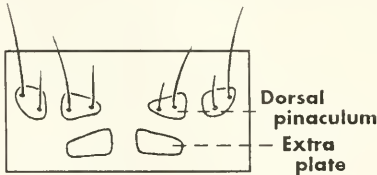


60



61

- A pair of transverse plates posterior to dorsal pinacula on mesothorax (Fig. 62) or plates absent; crochets in a mesal penellipse (Fig. 63) (or may be a circle weaker on lateral edge in *Lineodes integra* and *Udea rubigalis*) (Figs. 91, 93) **Pyraustinae, Glyphyriinae, Evergestinae** 32
- Note: Unless otherwise stated, the taxa following couplet 31 are **Pyraustinae**

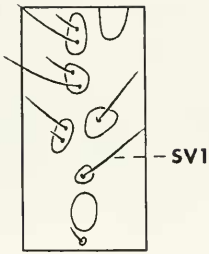


62

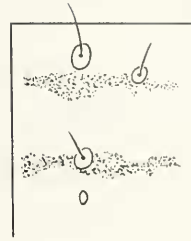


63

- 30. One subventral seta on meso- and metathorax (Fig. 64); body with 2 pink longitudinal stripes on each side (Fig. 65); pink-pigmented area around lateral setae on proleg-bearing segments **Eoreuma loftini** (Dyar)
 Distribution: Mexico and United States
 Hosts: 1998: *Cymbopogon citratus*, *Saccharum officinarum*
 pre-1998: corn, millet, rice, sorghum
 Note: one SV seta also occurs in *Crambus*; see Rodriguez-del-Bosque et al. 1990
- Two subventral setae on meso- and metathorax (Fig. 66); body with or without pigmented stripes; no pigmented area around lateral setae on proleg-bearing segments 31



64



65

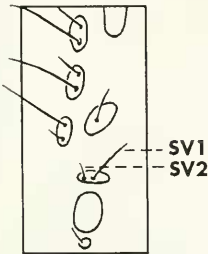
- 31. Body with pinkish middorsal stripe and two lateral stripes on each side (Fig. 67); setal pinacula concolorous with body *Chilo suppressalis* (Walker)

Distribution: Europe, Middle East, Southeast Asia to India, Oceania; adventive in Hawaii

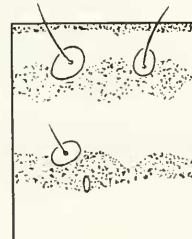
Hosts: 1998: *Cymbopogon citratus*

pre-1998: cabbage, corn, eggplant, millet, rice straw, sugarcane, sorghum, tomatoes, and wheat, many others

Note: see Bleszynski 1970, Meijermann and Ulenberg 1996, Whittle and Ferguson 1988



66



67

- Body with or without lateral stripes, but without pinkish middorsal stripe; setal pinacula concolorous with body (winter form) or darkly pigmented (summer form) *Diatraea* spp.

Distribution: tropical Western Hemisphere including southern U.S.

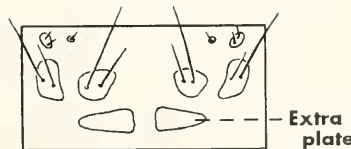
Hosts: 1998: *Musa* sp., *Saccharum officinarum*, *Zea mays*

pre-1998: rice, sorghum

Note: Some species of *Chilo* will key to *Diatraea* based on color pattern (Passoa, pers. comm.), but *Diatraea* does not occur in the Old World; see Box 1931, Dyar and Heinrich 1927

- 32. Meso- and metathorax without nonsetal bearing plates posterior to dorsal pinacula 33

- Meso- and metathorax with a pair of nonsetal bearing plates posterior to dorsal pinacula (Fig. 68) . . . 34



68

- 33. Small pinacula anterior to dorsal and subdorsal pinacula bearing microscopic setae (also occurring in *L. orbonalis*, see couplet 50) (Fig. 68) *Pyrausta* sp.

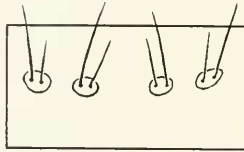
Distribution: cosmopolitan

Hosts: 1998: *Allium cepa*, *Citrullus lanatus*, *Mentha* sp., *Momordica charantia*, *Ocimum* sp., *Ocimum basilicum*, *Origanum* sp., *Thymus* sp., *Thymus vulgaris*

pre-1998: *Amaranthus* sp.

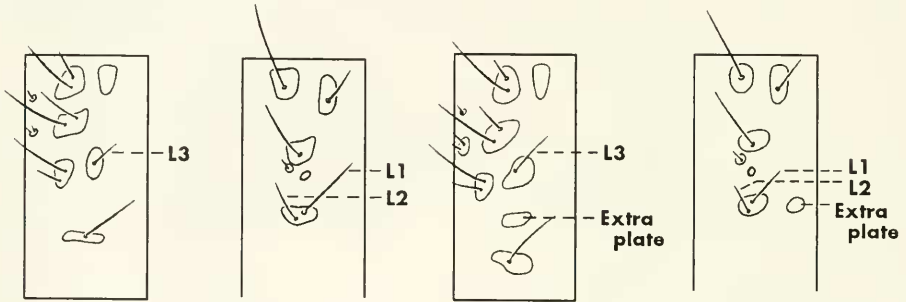
Note: According to Allyson (1981b) last instar larvae are characterized by 2 or 3 SV setae on A1, prothoracic shield lightly pigmented, pinacula below spiracles with paler pigmentation than those above spiracles, body at most 20 mm long; although the genus is cosmopolitan, most of the interceptions on the host plants are from the tropical Western Hemisphere

- No small pinacula anterior to dorsal and subdorsal pinacula (Fig. 69) 36



69

- 34. No extra nonsetal bearing plate below seta L3 on meso- and metathorax (Fig. 70) and behind L1 and L2 on abdominal segments 1 to 7 (Fig. 71) 35



70

71

72

73

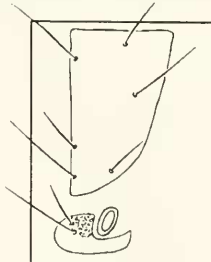
- An extra nonsetal bearing plate below seta L3 on meso- and metathorax (Fig. 72) and behind L1 and L2 on A1 to A7 (Fig. 73) *Conogethes* spp.

Distribution: southeast Asia, including India and Pakistan, Australia; does not occur in Hawaii

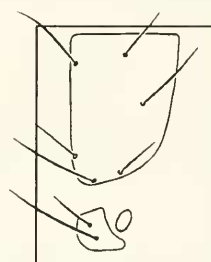
Hosts: *Castanea* sp., *Dimocarpus longan*, *Gardenia* sp., *Nephelium lappaceum*, *Psidium guajava*, *Pyrus communis*, *Syzygium malacense*

pre-1998: *Catalpa*, peach, pine

Note: prespiracular shield of prothorax extending below and beyond spiracle (Fig. 74); this species was known as *Dichrocrocis punctiferalis* (Guenée); *C. punctiferalis* is a complex of species (unpublished).



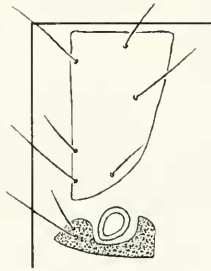
74



75

35. Prespiracular shield of prothorax crescent shaped extending below spiracle (Fig. 75)
 *Maruca vitrata* (Fabricius)

Distribution: Africa, Asia, Australia, Mexico to South America, adventive in Hawaii
 Hosts: 1998: *Phaseolus lunatus*, *Phaseolus vulgaris*, *Vigna* sp.
 pre-1998: beans, legumes, peas, pigeon peas
 Note: this species was known as *Maruca testulalis* (Geyer); there are a few records of adults captured in the southern U.S; synonymized by Munroe et al. 1995; see also Ferguson, not dated



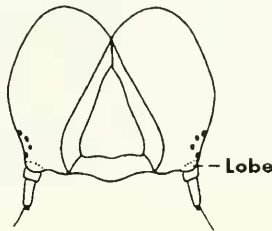
76

- Prespiracular shield of prothorax extending below and behind spiracle (Fig. 76) *Megastes* sp.

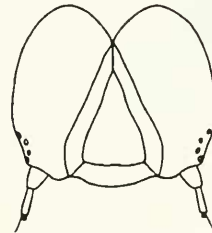
Distribution: West Indies
 Host: sweet potato

36. Head capsule with a lobelike extension over base of antenna (Fig. 77) *Ostrinia nubilalis* (Hübner)

Distribution: Europe and United States
 Hosts: 1998: *Capsicum* sp., *Malus* sp., strawberries, *Zea mays*
 pre-1998: beans, beets, celery, clover, cucumbers, eggplant, lettuce, peas, potatoes, rhubarb, string beans, tomatoes, wheat
 Note: see Heinrich 1919, Allyson 1981b



77



78

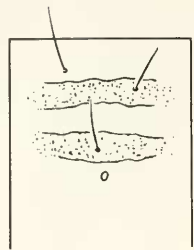
- Head capsule without a lobelike extension over base of antenna (Fig. 78) 37

37. Dorsal and subdorsal setae of the abdominal segments on strongly conical black chalazae
 *Evergestinae*, *Evergestis rimosalis* (Guenée)

Distribution: Western Hemisphere
 Hosts: 1998: *Brassica* sp.
 pre-1998: Brassicaceae, including cabbage, brussels sprouts, cauliflower, watercress
 Note: it should be reported as “probably *E. forficalis* (L.)” if the origin is Europe; see Munroe 1973

- Abdominal segments without conical black chalazae 38

- 38. Body with pinkish longitudinal stripes (Fig. 79) 39
- Body without pinkish longitudinal stripes 40



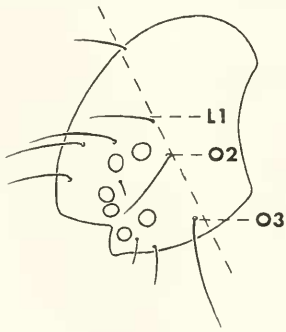
79

- 39. Head blackish or brownish with whitish areas along adfrontal sutures extending to vertex, seta O3 anterior to a line joining setae L1 and O2 (Fig. 80) **Glaphyriinae, *Hellula rogatalis*** (Hulst)

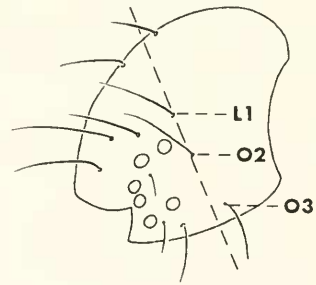
Distribution: Western Hemisphere; does not occur in Hawaii
 Hosts: *Brassica oleracea*, *Brassica rapa*
 pre-1998: mustard, radish, other Brassicaceae
 Note: should be reported as “probably *H. undalis* (F.)” if the origin is the Old World; see Munroe 1972, Allyson 1981a

- Head pale, mottled, area along adfrontal sutures pale but not white, seta O3 posterior to a line joining setae L1 and O2 (Fig. 81) **Glaphyriinae, *Hellula phidilealis*** (Walker)

Distribution: Western Hemisphere; adventive in Hawaii
 Hosts: *Brassica* sp., *Brassica oleracea*, *Brassica pekinensis*, *Brassica rapa*, *Raphanus sativus*, *Spinacia oleracea*
 pre-1998: white chard, and other Brassicaceae
 Note: see Munroe 1972



80

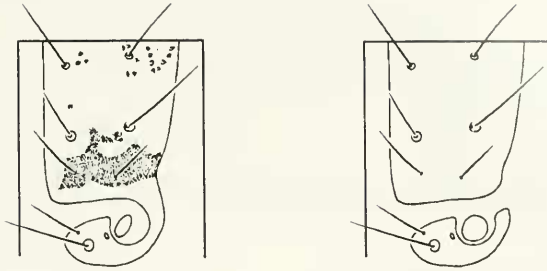


81

- 40. Prespiracular shield of prothorax extending below and behind spiracle (Figs. 82, 83) 41
- Prespiracular shield of prothorax not extending below and behind spiracle, but may completely enclose the spiracle (Figs. 85, 87) 42

- 41. Prothorax with sclerotization extending from posterolateral margin of prothoracic shield behind and below spiracle to prespiracular shield (Fig. 82) ***Achyra rantalis*** (Guenée)

Distribution: Mexico, West Indies, and United States
 Hosts: *Medicago sativa*, *Rosa* sp., *Sesuvium* sp.
 pre-1998: beets, cotton, soybeans, and many others
 Note: see Allyson 1976, 1981b



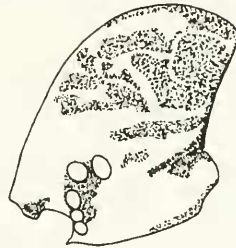
82

83

- Prespiracular shield of prothorax extending below and behind spiracle, not fused with posterolateral margin of prothoracic shield (Fig. 83) *Loxomorpha flavidissimalis* Grote

Distribution: Mexico
 Hosts: cactus

- 42. Head yellow with dark pattern (Fig. 84); prothoracic shield broadly shaded laterally (Figs. 85, 87) 43
- Head not patterned; prothoracic shield without dark shading laterally 44



84

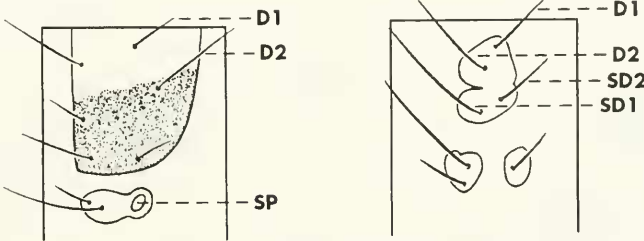
- 43. Prespiracular shield enclosing the spiracle (Fig. 85); A1 with SV trisetose; prothoracic shield with dark lateral shading extending to seta D2 (Fig. 85); dorsal and subdorsal pinacula of mesothorax fused (sometimes not fused in early instars) (Fig. 86) *Herpetogramma bipunctalis* (Fabricius)

Distribution: Western Hemisphere

Hosts: 1998: *Amaranthus* sp., *Amaranthus caudatus*, *Corchorus olitorius*, *Gomphrena* sp., *Jatropha* sp., *Spinacia* sp., *Strobilanthes* sp., *Xanthosoma brasiliense*

pre-1998: alfalfa, beets, cotton, soybeans

Note: see Allyson 1984



85

86

- Prespiracular shield not enclosing the spiracle (Fig. 87); A1 with SV setae bisetose; dorsal and subdorsal pinacula of mesothorax usually not fused (Fig. 88) *Rhectocraspeda periusalis* (Walker)

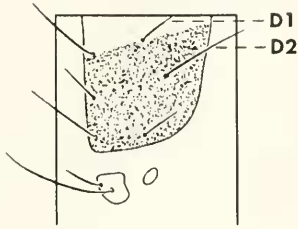
Distribution: West Indies and United States

Hosts: 1998: *Amaranthus* sp., *Momordica charantia*, *Strobilanthes* sp.

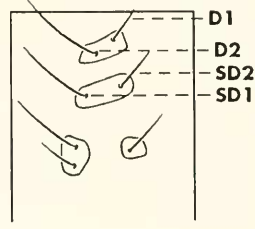
pre-1998: Solanaceae, including eggplant, potatoes, and tomatoes

Note: *Pilemia* Möschler is a junior synonym of *Rhectocraspeda* Warren, new combination in Munroe et al. 1995

- 44. Prothoracic shield with at least one dark reniform spot posterior to seta XD2 (Figs. 90, 92) 45
- Prothoracic shield without dark reniform spot posterior to seta XD2 47



87



88

- 45. D1 and D2 on mesothorax on the same sclerotized pinaculum (Fig. 89) . . . *Spoladea recurvalis* Fabricius

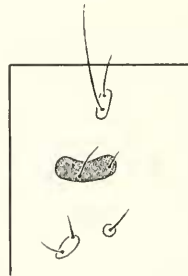
Distribution: cosmopolitan, adventive in Hawaii

Hosts: 1998: *Amaranthus* sp., *Amaranthus recurvalis*, *Celosia* sp., *Chrysanthemum* sp., *Colocasia* sp., *Eryngium foetidum*, *Eupatorium* sp., *Impatiens* sp., *Jatropha curcas*, *Mentha* sp., *Phytolacca americana*, *Polygonum perfoliatum*, *Spinacia* sp., *Spinacia oleracea*, *Xanthosoma* sp., *Zea mays*

pre-1998: Amaranthaceae, Areca palm, Asteraceae, beets, Chenopodiaceae, soybeans, swiss chard

Note: see Allyson 1984

- D1 and D2 on mesothorax on separate, unsclerotized pinacula 46



89

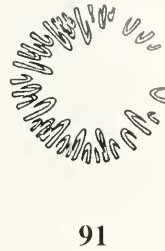
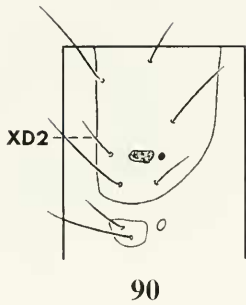
- 46. Prespiracular shield ovate (Fig. 90); crochets triordinal on mesal aspect (Fig. 91) *Udea rubigalis* (Guenée)

Distribution: Canada south to Costa Rica

Hosts: *Amaranthus* sp., *Ipomoea* sp., *Mentha* sp., *Ocimum* sp., *Ocimum basilicum*, *Pimenta dioica*, *Raphanus sativus*, *Spinacea oleracea*

pre-1998: alfalfa, cabbage, celery, *Chrysanthemum*, clover, cucumbers, lettuce, peas, roses, sugar beets, sweet potato

Note: should be reported as "probably *Udea ferrugalis* (Hübner)" if the origin is Europe; see Allyson 1984

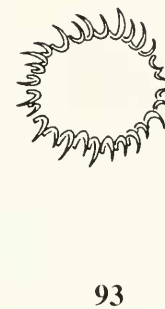
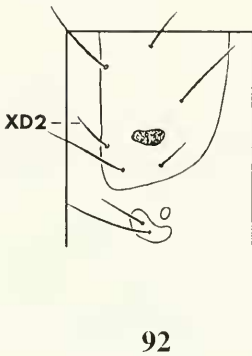


- Prespiracular shield crescent shaped extending below spiracle (Fig. 92); crochets biordinal on mesal aspect (Fig. 93) *Lineodes integra* (Zeller)

Distribution: United States, Mexico, West Indies

Hosts: 1998: *Capsicum* sp., *Lycopersicon lycopersicon*, *Physalis ixocarpa*, *Physalis peruviana*, *Solanum torvum*

pre-1998: Solanaceae, including eggplant

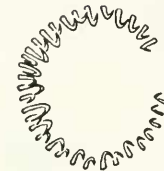
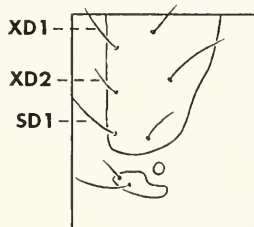
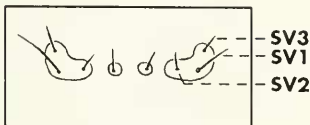


- 47. A1 with three subventral setae (Fig. 94); prothorax with seta XD2 equidistant from setae SD1 and XD1 (Fig. 95); crochets biordinal (Fig. 96) *Heudecasis duplifascialis* Hampson

Distribution: southeastern Asia, does not occur in Hawaii

Hosts: 1998: *Dianthus* sp., *Gardenia* sp., *Jasminium sambac*, Orchidaceae, *Plumeria rubra*, *Polianthes tuberosa*

pre-1998: jasmine

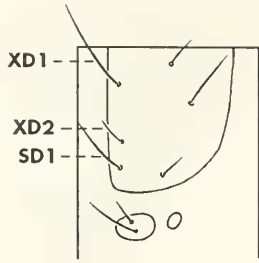


94

95

96

- A1 with less than three subventral setae (Figs. 99, 101); prothorax with seta XD2 closer to seta SD1 than to seta XD1 (Fig. 97); crochets triordinal (Fig. 98) 48

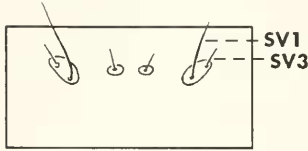


97

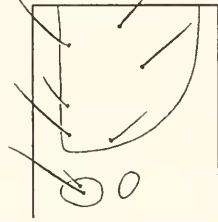


98

48. A1 with two subventral setae (Fig. 99); prespiracular shield oblong (Fig. 100) 49

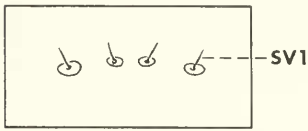


99

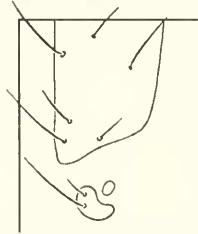


100

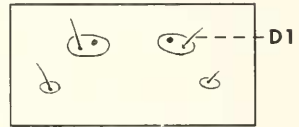
49. A1 with one subventral seta (Fig. 101); prespiracular shield crescent shaped, may extend under spiracle (Fig. 102); pinaculum of seta D1 on A2 to A8 with dark spot on anterior margin (Fig. 103) 50



101



102



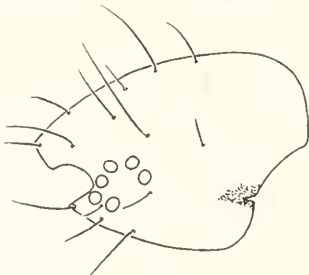
103

49. Head with a pigmented spot at genal angle (Fig. 104); mandible without a projection on lateral margin (Fig. 105); pinacula dark on early instars, pale in later instars *Diaphania nitidalis* (Stoll)

Distribution: Western Hemisphere

Hosts: 1998: *Cucumis* sp., *Cucumis melon*, *Cucumis sativus*, *Cucurbita* sp., *Cucurbita pepo*, *Sechium edule*

pre-1998: Cucurbitaceae, including gourds, melons, *Momordica* sp., squash



104



105

- Head without pigmented spot at genal angle; mandible with a projection on lateral margin (Fig. 106); pinacula concolorous with body in all instars *Diaphania indica* Saunders complex
- Distribution: Western Hemisphere
- Hosts: 1998: *Cucurbita* sp., *Fernaldia* sp., *Momordica charantia*, *Momordica balsamina*, *Murraya* sp., *Ocimum basilicum*, *Sechium edule*, *Thymus vulgaris*
- pre-1998: Cucurbitaceae, including cucumbers, cantaloupe, gourds, melons, pumpkins, squash
- Note: to separate pupae of *D. hyalinata* (L.) from *D. indica* (Saunders); proboscis extends to A7 in *indica* and to A8 or A9 in *hyalinata*; *hyalinata* occurs from Canada south to Argentina, *indica* is cosmopolitan, in the Western Hemisphere occurring from Florida to South America; see Whittle and Ferguson 1987a, Clavijo 1990



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- 50. Head, prothoracic shield, and body pinacula brownish yellow, not concolorous *Leucinodes orbonalis* (Guenée)
- Distribution: Africa and Southeast Asia, does not occur in Hawaii
- Hosts: 1998: *Capsicum* sp., *Punica granatum*, *Solanum* sp., *Solanum melongena*
- pre-1998: chayote, potatoes, Solanaceae, tomatoes
- Note: The character that separates *L. orbonalis* from *N. elegantalis*, the presence of a dark spot on the anterior margin of the pinaculum of seta D1 of A2 to A8, was found to occur in both species; no adults of this species have been observed from the Western Hemisphere; see Whittle and Ferguson 1987b
- Head and prothoracic shield pale yellow, pinacula concolorous with body *Neoleucinodes elegantalis* (Guenée)
- Distribution: Mexico to South America, and West Indies
- Hosts: 1998: *Capsicum* sp., *Capsicum annuum*, *Lycopersicon* sp., *Lycopersicon esculentum*, *Sechium edule*, *Solanum* sp., *Solanum melongena*, *Solanum quitoense*, *Solanum torvum*
- pre-1998: Solanaceae

Table 2. Hosts and pyraloid larvae.

Hosts	Pyraloid Species
<i>Abelmoschus esculentus</i> (see okra)	
Acacia	<i>Corcyra cephalonica</i>
<i>Acanthocereus</i>	<i>Ephestia elutella</i>
Alfalfa [<i>Medicago sativa</i>]	<i>Achyra rantalis</i>
	<i>Elasmopalpus lignosellus</i>
	<i>Ephestia elutella</i>
	<i>Herpetogramma bipunctalis</i>
	<i>Udea rubigalis</i>
<i>Allium</i>	<i>Ephestia elutella</i>
	<i>Pyralis farinalis</i>
<i>Allium cepa</i> (onion)	

Table 2. Continued.

Hosts	Pyriloid Species
<i>Allium sativum</i> (see garlic)	
allspice	<i>Udea rubigalis</i>
Amaranthaceae (see <i>Amaranthus</i> , <i>Celosia</i>)	
<i>Amaranthus</i>	<i>Cryptoblabes</i>
	<i>Herpetogramma bipunctalis</i>
	<i>Pyrausta</i>
	<i>Rhectocraspeda periusalis</i>
	<i>Spoladea recurvalis</i>
	<i>Udea rubigalis</i>
<i>Amaranthus caudatus</i> (see Inca wheat)	
<i>Anacardium</i>	<i>Cadra cautella</i>
<i>Ananas comosus</i> (see pineapple)	
<i>Annona</i>	<i>Amyelois transtilla</i>
	<i>Ectomyelois ceratoniae</i>
	<i>Ephestia kuehniella</i>
<i>Apium graveolens</i> (see celery)	
apple [<i>Malus</i>]	<i>Amyelois transtilla</i>
	<i>Ostrinia nubilalis</i>
	<i>Hendecasis duplifascialis</i>
	<i>Corcyra cephalonica</i>
Arabian jasmine [<i>Jasminium sambac</i>]	
<i>Arachis</i>	<i>Paralipsa gularis</i>
<i>Arachis hypogaea</i> (see peanuts)	<i>Cadra cautella</i>
<i>Areca catechu</i> (see areca nut, betel nut)	<i>Spoladea recurvalis</i>
areca nut, betel nut [<i>Areca catechu</i>]	
Areca palm [<i>Chrysalidocarpus</i>]	<i>Phidotricha erigens</i>
<i>Armoracia rusticana</i> (see horseradish)	
ash gourd [<i>Benincasa hispida</i>]	<i>Elasmopalpus lignosellus</i>
<i>Asparagus officinalis</i> (see asparagus)	<i>Homoeosoma electellum</i>
asparagus [<i>Asparagus officinalis</i>]	<i>Spoladea recurvalis</i>
Asteraceae	<i>Aglossa caprealis</i>
	<i>Cadra cautella</i>
avocado [<i>Persea americana</i>]	<i>Paralipsa gularis</i>
<i>Bambusa</i>	<i>Corcyra cephalonica</i>
	<i>Paralipsa gularis</i>
bastard cedar [<i>Guazuma ulmifolia</i>]	<i>Diaphania indica</i> complex
	<i>Pyrausta</i>
	<i>Udea rubigalis</i>
beans (many genera & species)	<i>Elasmopalpus lignosellus</i>
	<i>Fundella pellucens</i>
	<i>Maruca vitrata</i>
	<i>Ostrinia nubilalis</i>
	<i>Udea rubigalis</i>
	<i>Cadra figulilella</i>
beans, dried	<i>Achyra rantalis</i>
beets [<i>Beta vulgaris</i>]	<i>Herpetogramma bipunctalis</i>
	<i>Ostrinia nubilalis</i>
	<i>Spoladea recurvalis</i>
	<i>Udea rubigalis</i>
	<i>Etiella zinckenella</i>
bell pepper [<i>Capsicum annuum</i>]	<i>Neoleucinodes elegantalis</i>
	<i>Paralipsa gularis</i>
	<i>Plodia interpunctella</i>

Table 2. Continued.

Hosts	Pyriloid Species
<i>Benincasa hispida</i> (see ash gourd)	<i>Cadra cautella</i>
<i>Berberis</i>	<i>Plodia interpunctella</i>
<i>Beta vulgaris</i> (see beets, white chard)	
<i>Bidens</i>	<i>Homocosoma electellum</i>
black walnut [<i>Juglans nigra</i>]	<i>Ectomyelois ceratoniae</i>
	<i>Ephestia elutella</i>
<i>Brassica</i> (see mustard)	
<i>Brassica napus</i> , <i>B. rapa</i> (see turnip)	
<i>Brassica oleracea</i> (see brussels sprouts, cabbage, cauliflower)	
<i>Brassica pekinensis</i> (see Chinese cabbage)	
Brassicaceae (see cabbage, turnips, brussels sprouts, cauliflower, mustard)	
broad bean [<i>Vicia faba</i>]	<i>Plodia interpunctella</i>
brussels sprouts [<i>Brassica oleracea</i>]	<i>Evergestis rimosalis</i>
	<i>Hellula phidilealis</i>
	<i>Hellula rogatalis</i>
	<i>Etiella zinckenella</i>
	<i>Maruca vitrata</i>
	<i>Mussidia nigrivenella</i>
	<i>Chilo suppressalis</i>
	<i>Evergestis rimosalis</i>
	<i>Hellula phidilealis</i>
	<i>Hellula rogatalis</i>
	<i>Udea rubigalis</i>
<i>Cabomba</i> (see fanwort)	
cacao [<i>Theobroma cacao</i>]	<i>Cadra cautella</i>
	<i>Mussidia nigrivenella</i>
	<i>Etiella zinckenella</i>
	<i>Loxomorpha flavidissimalis</i>
<i>Caesalpinia pulcherrima</i> (see dwarf poinciana)	
<i>Cajanus cajan</i> (see pigeon peas)	
calabar beans [<i>Physostigma venenosum</i>]	<i>Mussidia nigrivenella</i>
<i>Calophyllum brasiliense</i> (see Santa Maria, galba)	
<i>Camellia sinensis</i> (see tea)	
cantaloupe [<i>Cucumis melo</i>]	
<i>Capsicum</i>	
	<i>Diaphania indica</i> complex
	<i>Diaphania nitidalis</i>
	<i>Cadra cautella</i>
	<i>Cadra figulilella</i>
	<i>Ectomyelois ceratoniae</i>
	<i>Ephestia elutella</i>
	<i>Leucinodes orbonalis</i>
	<i>Lineodes integra</i>
	<i>Neoleucinodes elegantalis</i>
	<i>Ostrinia nubilalis</i>
	<i>Plodia interpunctella</i>
<i>Capsicum annuum</i> (see bell pepper)	
<i>Carapa guianensis</i> (see crabwood)	
<i>Carica papaya</i> (see papaya)	
carob [<i>Ceratonia siliqua</i>]	<i>Cadra calidella</i>
	<i>Ectomyelois ceratoniae</i>
	<i>Mussidia nigrivenella</i>
	<i>Paralipsa gularis</i>

Table 2. Continued.

Hosts	Pyriloid Species
<i>Cassia</i> (see cassia)	
<i>Cassia fistula</i> (see golden shower tree)	
<i>Cassia grandis</i>	<i>Trachylepidia fructicassiella</i>
cassia [<i>Cassia</i>]	<i>Corcyra cephalonica</i>
	<i>Paralipsa gularis</i>
	<i>Trachylepidia fructicassiella</i>
<i>Castanea</i> (see chestnut)	
<i>Castanea sativa</i> (see European chestnut)	
<i>Catalpa</i>	<i>Conogethes</i>
cat-claw mimosa [<i>Mimosa pigra</i>]	<i>Elasmopalpus lignosellus</i>
	<i>Phidotricha erigens</i>
	Schoenobiinae
cat-tail [<i>Typha latifolia</i>]	<i>Evergestis rimosalis</i>
cauliflower [<i>Brassica oleracea</i>]	<i>Hellula phidilealis</i>
	<i>Hellula rogatalis</i>
<i>Cedrela</i> (see Spanish cedar)	
celery [<i>Apium graveolens</i>]	<i>Ostrinia nubilalis</i>
	<i>Udea rubigalis</i>
	<i>Spoladea recurvalis</i>
<i>Celosia</i>	
<i>Ceratonia siliqua</i> (see carob)	<i>Ephestia elutella</i>
cereal products	<i>Ectomyelois ceratoniae</i>
<i>Cereus</i>	<i>Diaphania nitidalis</i>
	<i>Leucinodes orbonalis</i>
	<i>Neoleucinodes elegantalis</i>
	<i>Cryptoblabes</i>
	<i>Diaphania indica</i> complex
<i>Chaenomeles japonica</i>	
chayote [<i>Sechium edule</i>]	
Chenopodiaceae (see spinach, beets, swiss chard)	
cherry tomato [<i>Physalis peruviana</i>]	<i>Lineodes integra</i>
chestnut [<i>Castanea</i>]	<i>Cadra calidella</i>
	<i>Conogethes</i>
	<i>Ephestia elutella</i>
	<i>Paralipsa gularis</i>
	<i>Ancylostomia stercorea</i>
	<i>Etiella zinckenella</i>
	<i>Plodia interpunctella</i>
	<i>Ectomyelois ceratoniae</i>
	<i>Hellula phidilealis</i>
	<i>Ectomyelois ceratoniae</i>
chickpeas [<i>Cicer arietinum</i>]	<i>Spoladea recurvalis</i>
	<i>Udea rubigalis</i>
	<i>Ephestia kuehniella</i>
<i>Chimonanthus</i>	
Chinese cabbage [<i>Brassica pekinensis</i>]	
Chinese pear [<i>Pyrus pyriflora</i>]	
<i>Chrysalidocarpus</i> (see areca palm)	
<i>Chrysanthemum</i>	
<i>Chrysophyllum</i>	
<i>Cicer arietinum</i> (see chickpeas)	
<i>Citrullus lanatus</i> (see watermelon)	
<i>Citrus</i>	<i>Cadra cautella</i>
<i>Citrus sinensis</i> (see oranges)	
<i>Cleome</i> (see spider-plant)	
clover [<i>Trifolium</i>]	<i>Ostrinia nubilalis</i>
	<i>Udea rubigalis</i>
	<i>Corcyra cephalonica</i>
cocoa beans [<i>Theobroma cacao</i>]	
<i>Coffea arabica</i> (see coffee)	
coffee [<i>Coffea arabica</i>]	<i>Cadra cautella</i>
	<i>Corcyra cephalonica</i>
	<i>Elasmopalpus lignosellus</i>

Table 2. Continued.

Hosts	Pyraloid Species
<i>Cola</i>	<i>Corcyra cephalonica</i>
<i>Coleus</i> (see <i>Plectranthus</i>)	
<i>Colocasia</i>	<i>Spoladea recurvalis</i>
Compositae (see Asteraceae)	
<i>Corchorus olitorius</i> (see tossa jute) corn [<i>Zea mays</i>]	<i>Amyelois transtilla</i> <i>Cadra cautella</i> <i>Chilo suppressalis</i> <i>Diatraea</i> <i>Ectomyelois ceratoniae</i> <i>Elasmopalpus lignosellus</i> <i>Etiella zinckenella</i> <i>Eoreuma loftini</i> <i>Hypsipyla</i> <i>Moodna bisinuella</i> <i>Ostrinia nubilalis</i> <i>Paralipsa gularis</i> <i>Phidotricha erigens</i> <i>Spoladea recurvalis</i>
<i>Corylus avellana</i> (see European filbert, European hazelnut) cotton [<i>Gossypium</i>]	<i>Achrya rantalis</i> <i>Herpetogramma bipunctalis</i> <i>Homoeosoma electellum</i> <i>Phidotricha erigens</i> <i>Ancylostomia stercorea</i> <i>Elasmopalpus lignosellus</i> <i>Fundella pellucens</i> <i>Maruca vitrata</i> <i>Trachylepidia fructicassella</i>
cow peas [<i>Vigna unguiculata</i>]	<i>Amyelois transtilla</i> <i>Ectomyelois ceratoniae</i> <i>Hypsipyla</i>
crabapple [<i>Malus sylvestris</i>]	
crabwood [<i>Carapa guianensis</i>]	
Cruciferae (see Brassicaceae)	
cucumbers [<i>Cucumis sativa</i>]	<i>Diaphania indica</i> complex <i>Diaphania nitidalis</i> <i>Ostrinia nubilalis</i> <i>Udea rubigalis</i> <i>Diaphania nitidalis</i>
<i>Cucumis</i>	
<i>Cucumis melo</i> (see cantaloupe)	
<i>Cucumis sativus</i> (see cucumber)	
<i>Cucurbita</i> (see gourds, squash)	<i>Cadra cautella</i> <i>Diaphania indica</i> complex <i>Diaphania nitidalis</i> <i>Ectomyelois ceratoniae</i> <i>Etiella zinckenella</i> <i>Paralipsa gularis</i>
<i>Cucurbita pepo</i> (see pumpkin)	
Cucurbitaceae (see squash, cantaloupes, cucumbers, gourds, pumpkins)	
cumin [<i>Cuminum</i>]	
<i>Cuminum</i> (see cumin)	
<i>Cydonia oblonga</i> (see quince)	
<i>Cymbopogon citratus</i> (see lemon grass)	
<i>Cyperus papyrus</i> (see papyrus)	<i>Corcyra cephalonica</i>

Table 2. Continued.

Hosts	Pyraloid Species
dates [<i>Phoenix</i>]	<i>Cadra calidella</i> <i>Cryptoblabes</i> <i>Ectomyelois ceratoniae</i>
date palm [<i>Phoenix dactylifera</i>]	<i>Cadra cautella</i> <i>Cadra figulilella</i> <i>Ectomyelois ceratoniae</i> <i>Paralipsa gularis</i> <i>Ephestia kuehniella</i>
<i>Demetia</i>	
<i>Dianthus</i> (see pink)	
<i>Dinocarpus longan</i> (see longan)	
dried foodstuffs	<i>Cadra calidella</i>
dried fruits	<i>Cadra calidella</i>
	<i>Cadra figulilella</i>
	<i>Cadra figulilella</i>
dried seeds	<i>Cadra cautella</i>
dried vegetable products	<i>Ephestia elutella</i>
	<i>Ephestia kuehniella</i>
	<i>Pyralis farinalis</i>
	<i>Trachylepidia fructicassella</i>
	<i>Paralipsa gularis</i>
dunnage	<i>Amyelois transtilla</i>
dwarf poinciana [<i>Caesalpinia pulcherrima</i>]	<i>Chilo suppressalis</i>
eggplant [<i>Solanum melongena</i>]	<i>Leucinodes orbonalis</i>
	<i>Lineodes integra</i>
	<i>Neoleucinodes elegantalis</i>
	<i>Ostrinia nubilalis</i>
	<i>Rhectocraspeda periusalis</i>
	<i>Paralipsa gularis</i>
<i>Elaeis</i>	
<i>Eriobotrya japonica</i> (see loquat)	
<i>Eryngium foetidum</i>	<i>Spoladea recurvalis</i>
<i>Eupatorium</i>	<i>Spoladea recurvalis</i>
European chestnut [<i>Castanea sativa</i>]	<i>Cadra figulilella</i>
	<i>Ectomyelois ceratoniae</i>
	<i>Etiella zinckenella</i>
	<i>Plodia interpunctella</i>
	<i>Elasmopalpus lignosellus</i>
European filbert, European hazelnut	
[<i>Corylus avellana</i>]	
Fabaceae (see legumes)	
Fanwort (<i>Cabomba</i>)	<i>Parapoynx</i>
<i>Fernaldia</i>	<i>Diaphania indica</i> complex
<i>Ficus</i>	<i>Cadra calidella</i>
	<i>Cadra figulilella</i>
<i>Ficus carica</i> (see fig)	
Fig [<i>Ficus carica</i>]	<i>Cadra calidella</i>
	<i>Cadra figulilella</i>
	<i>Ectomyelois ceratoniae</i>
	<i>Plodia interpunctella</i>
	<i>Pyralis farinalis</i>
foodstuffs	
<i>Fragaria</i> (see strawberries)	
<i>Gardenia</i>	<i>Conogethes</i>
	<i>Hendecasis duplifascialis</i>
	<i>Aglossa caprealis</i>
garlic [<i>Allium sativum</i>]	<i>Cadra cautella</i>
	<i>Cadra figulilella</i>

Table 2. Continued.

Hosts	Pyraloid Species
<i>Gleditsia</i>	<i>Plodia interpunctella</i>
<i>Glycine max</i> (see soybeans)	
golden shower tree [<i>Cassia fistula</i>]	<i>Trachylepidia fructicassiella</i>
Gomphrena	<i>Herpetogramma bipunctalis</i>
<i>Gossypium</i> (see cotton)	
<i>Gossypium hirsutum</i> (see upland cotton)	
gourds [<i>Cucurbita</i>]	<i>Diaphania indica</i> complex
	<i>Diaphania nitidalis</i>
grain (damp)/fungus	<i>Aglossa caprealis</i>
grapes [<i>Vitis</i>]	<i>Cryptoblabes</i>
	<i>Ephestia ehutella</i>
	<i>Plodia interpunctella</i>
	<i>Cadra cautella</i>
	<i>Cadra figulilella</i>
	<i>Conogethes</i>
	<i>Cryptoblabes</i>
	<i>Ectomyelois ceratoniae</i>
guajava or guava [<i>Psidium guajava</i>]	
	<i>Cadra cautella</i>
<i>Guazuma ubmifolia</i> (see bastard cedar)	
guizotia [<i>Guizotia abyssinical</i>]	
<i>Guizotia abyssinica</i> (see guizotia)	
<i>Helianthus annuus</i> (see sunflower)	
<i>Hibiscus</i> (see mallow)	
horseradish [<i>Armoracia rusticana</i>]	<i>Trachylepidia fructicassiella</i>
horse-radish tree [<i>Moringa oleifera</i>]	<i>Ephestia kuehniella</i>
<i>Hydrilla</i>	<i>Parapoynx</i>
<i>Hygrophila</i>	<i>Parapoynx</i>
<i>Impatiens</i>	<i>Spoladea recurvalis</i>
Inca wheat [<i>Amaranthus caudatus</i>]	<i>Herpetogramma bipunctalis</i>
<i>Inga</i>	<i>Corcyra cephalonica</i>
	<i>Trachylepidia fructicassiella</i>
	<i>Udea rubigalis</i>
<i>Ipomoea</i>	
<i>Ipomoea batatas</i> (see sweet potato)	<i>Hendecasis duplifascialis</i>
jasmine [<i>Jasminium</i>]	
<i>Jasminium</i> (see jasmine)	
<i>Jasminium sambac</i> (see Arabian jasmine)	<i>Herpetogramma bipunctalis</i>
<i>Jatropha</i>	
<i>Jatropha curcas</i> (see physic nut)	
Johnson grass [<i>Sorghum halapense</i>]	<i>Elasmopalpus lignosellus</i>
<i>Juglans</i> (see walnuts)	
<i>Juglans nigra</i> (see black walnut)	
jujube [<i>Ziziphus jujuba</i>]	<i>Plodia interpunctella</i>
lablab bean [<i>Lablab purpureus</i>]	<i>Etiella zinckenella</i>
<i>Lablab purpureus</i> (see lablab bean)	
<i>Lactuca</i> (see lettuce)	
langsats [<i>Lansium domesticum</i>]	<i>Ectomyelois ceratoniae</i>
	<i>Paralipsa gularis</i>
<i>Lansium domesticum</i> (see langsats)	
legumes	<i>Ectomyelois ceratoniae</i>
	<i>Etiella zinckenella</i>
	<i>Maruca vitrata</i>
Leguminosae (see Fabaceae)	
Lemon grass [<i>Cymbopogon citratus</i>]	<i>Chilo suppressalis</i>
	<i>Eoreuma loftini</i>
<i>Lens</i>	<i>Corcyra cephalonica</i>

Table 2. Continued.

Hosts	Pyraloid Species
lettuce [<i>Lactuca</i>]	<i>Ostrinia nubilalis</i>
	<i>Udea rubigalis</i>
lima beans [<i>Phaseolus lunatus</i>]	<i>Etiella zinckenella</i>
	<i>Fundella pellucens</i>
	<i>Maruca vitrata</i>
	<i>Phidotricha erigens</i>
	<i>Parapoynx</i>
Linnophila	
locust bean (see carob)	
longan [<i>Dimocarpus longan</i>]	<i>Conogethes</i>
	<i>Cryptoblabes</i>
	<i>Cryptoblabes</i>
	<i>Conogethes</i>
	<i>Phidotricha erigens</i>
	<i>Neoleucinodes elegantalis</i>
loquat [<i>Eriobotrya japonica</i>]	
<i>Lycopersicon</i>	
<i>Lycopersicon esculentum</i>	
(= <i>L. lycopersicon</i>) (see tomatoes)	
<i>Lythrum</i> (see loosestrife)	
mahogany [<i>Swietenia</i>]	<i>Hypsipyla</i>
mallow [<i>Hibiscus</i>]	<i>Conogethes</i>
<i>Malus</i> (see apple)	
<i>Malus sylvestris</i> (see crabapple)	
<i>Mammea</i>	<i>Phidotricha erigens</i>
<i>Mangifera indica</i> (see mango)	
mango [<i>Mangifera indica</i>]	<i>Amyelois transtilla</i>
	<i>Ectomyelois ceratoniae</i>
	<i>Phidotricha erigens</i>
<i>Manihot esculenta</i> (see manioc)	
Manila tamarind [<i>Pithecellobium dulce</i>]	<i>Cadra cautella</i>
	<i>Ectomyelois ceratoniae</i>
manioc [<i>Manihot esculenta</i>]	<i>Cadra figulilella</i>
<i>Maranta</i>	<i>Elasmopalpus lignosellus</i>
<i>Medicago arabica</i> (see clover)	
<i>Medicago sativa</i> (see alfalfa)	
melons [<i>Cucumis melo</i>]	<i>Diaphania indica</i> complex
	<i>Diaphania nitidalis</i>
	<i>Elasmopalpus lignosellus</i>
	<i>Pyrausta</i>
	<i>Spoladea recurvalis</i>
	<i>Udea rubigalis</i>
	<i>Chilo suppressalis</i>
	<i>Eoreuma loftini</i>
<i>Mimosa pigra</i> (see cat-claw mimosa)	
<i>Momordica</i>	<i>Diaphania nitidalis</i>
<i>Momordica balsamina</i>	<i>Diaphania indica</i> complex
<i>Momordica charantia</i>	<i>Diaphania nitidalis</i>
	<i>Pyrausta</i>
	<i>Rhectocraspeda periusalis</i>
<i>Moinga oleifera</i> (see horse-radish tree)	
<i>Morus</i>	<i>Cadra calidella</i>
	<i>Cadra cautella</i>
	<i>Cadra figulilella</i>
	<i>Plodia interpunctella</i>
	<i>Diaphania indica</i> complex
<i>Murraya</i>	<i>Cryptoblabes</i>
<i>Musa</i>	<i>Diatraea</i>

Table 2. Continued.

Hosts	Pyraloid Species
mustard [<i>Brassica</i>]	<i>Corcyra cephalonica</i> <i>Ephestia elutella</i> <i>Evergestis rimosalis</i> <i>Hellula phidilealis</i> <i>Hellula rogatalis</i> <i>Paralipsa gularis</i> <i>Paraponyx</i> <i>Neoleucinodes elegantalis</i>
<i>Myriophyllum</i>	
nananjilla [<i>Solanum quitoense</i>]	
<i>Narcissus tazetta</i> (see polyanthus narcissus)	
<i>Nephelium lappaceum</i> (see rambutan)	
nosegay [<i>Plumeria rubra</i>]	<i>Hendecasis duplifascialis</i>
nuts (stored)	<i>Cadra calidella</i> <i>Cadra figulilella</i> <i>Ectomyelois ceratoniae</i> <i>Udea rubigalis</i> <i>Pyrausta</i>
<i>Ocimum</i>	
<i>Ocimum basilicum</i> (see basil)	
okra [<i>Abelmoschus esculentus</i>]	<i>Corcyra cephalonica</i>
<i>Oncidium</i>	<i>Paralipsa gularis</i>
onion [<i>Allium cepa</i>]	<i>Pyrausta</i>
<i>Opuntia</i> (see cactus)	
oranges [<i>Citrus sinensis</i>]	<i>Amyelois transtilla</i> <i>Cryptoblabes</i> <i>Homoeosoma electellum</i> <i>Hendecasis duplifascialis</i> <i>Pyrausta</i>
Orchidaceae	
<i>Origanum</i>	<i>Corcyra cephalonica</i>
<i>Oryza</i>	<i>Plodia interpunctella</i>
<i>Oryza sativa</i> (see rice)	
packing	<i>Aglossa caprealis</i> <i>Pyralis farinalis</i>
<i>Paeonia</i> (see peony)	
<i>Panicum miliaceum</i> (see millet)	
papaya [<i>Carica papaya</i>]	<i>Cadra cautella</i>
papyrus [<i>Cyperus papyrus</i>]	<i>Paralipsa gularis</i>
<i>Parkia</i>	<i>Etiella zinckenella</i>
peach [<i>Prunus persica</i>]	<i>Amyelois transtilla</i> <i>Conogethes</i> <i>Plodia interpunctella</i>
peanuts [<i>Arachis hypogaea</i>]	<i>Cadra cautella</i>
pear [<i>Pyrus communis</i>]	<i>Amyelois transtilla</i> <i>Cadra cautella</i> <i>Conogethes</i> <i>Ectomyelois ceratoniae</i>
peas [<i>Pisum sativum</i>]	<i>Ancylostomia stercorea</i> <i>Cadra cautella</i> <i>Elasmopalpus lignosellus</i> <i>Etiella zinckenella</i> <i>Fundella pellucens</i> <i>Maruca vitrata</i> <i>Ostrinia nubilalis</i> <i>Udea rubigalis</i>

Table 2. Continued.

Hosts	Pyraloid Species
peony [<i>Paeonia</i>]	<i>Amyelois transtilla</i>
<i>Persea americana</i> (see avocado)	
<i>Petiveria alliacea</i>	<i>Phidotriza erigens</i>
<i>Phaseolus</i>	<i>Cadra cautella</i>
	<i>Ectomyelois ceratoniae</i>
	<i>Plodia interpunctella</i>
<i>Phaseolus lunatus</i> (see butter beans, lima beans)	
<i>Phaseolus vulgaris</i> (see string beans)	
<i>Phoenix</i> (see dates)	
<i>Phoenix dactylifera</i> (see date palm)	
<i>Physalis ixocarpa</i> (see tomatillo)	
<i>Physalis peruviana</i> (see cherry tomato)	
physic nut [<i>Jatropha curcas</i>]	<i>Spoladea recurvalis</i>
<i>Physostigma venenosum</i> (see calabar beans)	
<i>Phytolacca americana</i> (see pokeweed)	
pigeon peas [<i>Cajanus cajan</i>]	<i>Ancylostomia stercorea</i>
	<i>Amyelois transtilla</i>
	<i>Etiella zinckenella</i>
	<i>Fundella pellucens</i>
	<i>Maruca vitrata</i>
<i>Pimenta dioica</i> (see allspice, pimento)	
pimento	<i>Udea rubigalis</i>
pine [<i>Pinus</i>]	<i>Conogethes</i>
pineapple [<i>Ananas comosus</i>]	<i>Alpheias conspirata</i>
	<i>Cadra cautella</i>
	<i>Cryptoblabes</i>
	<i>Elasmopalpus lignosellus</i>
	<i>Genopaschia protomis</i>
	<i>Paralipsa gularis</i>
	<i>Hendecasis duplifascialis</i>
pink [<i>Dianthus</i>]	
<i>Pinus</i> (see pine)	
<i>Pista stratiotes</i> (see water-lettuce)	
<i>Pistacia</i>	<i>Plodia interpunctella</i>
<i>Pisum sativum</i> (see peas)	
<i>Pithecellobium dulce</i> (see manila tamarind)	
<i>Plectranthus</i>	<i>Cadra calidella</i>
<i>Plumeria rubra</i> (see nosegay)	
Poaceae	<i>Plodia interpunctella</i>
pokeweed [<i>Phytolacca americana</i>]	<i>Spoladea recurvalis</i>
<i>Polianthus tuberosa</i> (see tuberose)	
polyanthus narcissus [<i>Narcissus tazetta</i>]	<i>Pyralis farinalis</i>
<i>Polygonum perfoliatum</i>	<i>Spoladea recurvalis</i>
pomegranate [<i>Punica granatum</i>]	<i>Amyelois transtilla</i>
	<i>Cryptoblabes</i>
	<i>Ectomyelois ceratoniae</i>
	<i>Ephestia elutella</i>
	<i>Leucinodes orbonalis</i>
	<i>Paralipsa gularis</i>
	<i>Plodia interpunctella</i>
potatoes [<i>Solanum tuberosum</i>]	<i>Ephestia elutella</i>
	<i>Leucinodes orbonalis</i>
	<i>Ostrinia nubilalis</i>
	<i>Rhectocraspeda periusalis</i>
<i>Prosopis</i>	<i>Plodia interpunctella</i>
<i>Protea</i>	<i>Ephestia elutella</i>

Table 2. Continued.

Hosts	Pyriloid Species
prune plum [<i>Prunus domestica</i>] <i>Prunus</i>	<i>Plodia interpunctella</i> <i>Cadra calidella</i> <i>Cadra figulilella</i> <i>Ephestia elutella</i>
<i>Prunus avium</i> (see sweet cherry) <i>Prunus domestica</i> (see prune plum) <i>Prunus persica</i> (see peach) <i>Psidium guajava</i> (see guajava or guava)	
pumpkin [<i>Cucurbita pepo</i>]	<i>Diaphania indica</i> complex <i>Diaphania nitidalis</i>
<i>Punica granatum</i> (see pomegranate) <i>Pyrus communis</i> (see pear) <i>Pyrus pyriflora</i> (see Chinese pear) quince [<i>Cydonia oblonga</i>]	<i>Amyelois transtilla</i> <i>Ectomyelois ceratoniae</i> <i>Etiella zinckenella</i> <i>Hellula phidilealis</i> <i>Hellula rogatalis</i> <i>Udea rubigalis</i>
radish [<i>Raphanus sativus</i>]	<i>Cryptoblabes</i> <i>Ephestia elutella</i> <i>Plodia interpunctella</i>
raisins [<i>Vitis</i>]	<i>Aglossa caprealis</i> <i>Conogethes</i> <i>Paralipsa gularis</i> <i>Amyelois transtilla</i>
rambutan [<i>Neptelium lappaceum</i>]	
<i>Randia</i> <i>Raphanus sativus</i> (see radish) <i>Rheum rhubarbarum</i> (see rhubarb) <i>Rhododendron</i> rhubarb [<i>Rheum rhubarbarum</i>] rice [<i>Oryza sativa</i>]	<i>Paralipsa gularis</i> <i>Ostrinia nubilalis</i> <i>Cadra cautella</i> <i>Chilo suppressalis</i> <i>Corcyra cephalonica</i> <i>Diatraea</i> <i>Eoreuma loftini</i> <i>Ephestia elutella</i> <i>Paralipsa gularis</i>
rice straw <i>Rorippa</i> (see watercress) <i>Rosa</i> (see roses)	see rice
rose, Malay apple [<i>Syzygium malaccense</i>] roses [<i>Rosa</i>]	<i>Conogethes</i> <i>Achyra rantalis</i> <i>Cadra cautella</i> <i>Udea rubigalis</i>
<i>Rubus</i> <i>Rumex</i> <i>Saccharum officinarum</i> (see sugarcane) Santa Maria, galba [<i>Calophyllum brasiliense</i>] <i>Sechium edule</i> (see chayote) sesame [<i>Sesamum indicum</i>]	<i>Cadra cautella</i> <i>Ancylostomia stercorea</i>
<i>Sesamum indicum</i> (see sesame) <i>Sesbania</i> <i>Sesuvium</i> <i>Sida</i> Solanaceae (see eggplant, potatoes, tomatoes)	<i>Cadra cautella</i> <i>Corcyra cephalonica</i> <i>Ectomyelois ceratoniae</i> <i>Achyra rantalis</i> <i>Elasmopalpus lignosellus</i>

Table 2. Continued.

Hosts	Pyriloid Species
<i>Solanum</i>	<i>Leucinodes orbonalis</i> <i>Neoleucinodes elegantalis</i> <i>Paralipsa gularis</i>
<i>Solanum melongena</i> (see eggplant)	
<i>Solanum quitoense</i> (see naranjilla)	
<i>Solanum torvum</i> (see turkey berry)	
<i>Solanum tuberosum</i> (see potatoes)	
<i>Sorghum</i> (see sorghum)	
sorghum [<i>Sorghum</i>]	<i>Chilo suppressalis</i> <i>Corcyra cephalonica</i> <i>Diatraea</i> <i>Elasmopalpus lignosellus</i> <i>Eoreuma loftini</i> <i>Phidotriza erigens</i>
<i>Sorghum bicolor</i> (see sorghum)	
<i>Sorghum halapense</i> (see Johnson grass)	
soybeans [<i>Glycine max</i>]	<i>Achyra rantalis</i> <i>Elasmopalpus lignosellus</i> <i>Herpetogramma bipunctalis</i> <i>Spoladea recurvalis</i>
Spanish cedar [<i>Cedrela</i>]	<i>Hypsipyla</i> <i>Hellula phidilealis</i> <i>Spoladea recurvalis</i> <i>Udea rubigalis</i>
spinach	<i>Herpetogramma bipunctalis</i> <i>Spoladea recurvalis</i>
<i>Spinacia</i>	
<i>Spinacia oleracea</i> (see spinach)	
squash [<i>Cucurbita</i>]	<i>Diaphania indica</i> complex <i>Diaphania nitidalis</i> <i>Paralipsa gularis</i>
<i>Stirlingia</i>	
stored fruit products	<i>Plodia interpunctella</i> <i>Ephestia kuehniella</i> <i>Mussidia nigrivenella</i> <i>Pyralis farinalis</i>
stored grain (including cereals)	<i>Plodia interpunctella</i> <i>Cadra cautella</i> <i>Corcyra cephalonica</i> <i>Ephestia elutella</i> <i>Ephestia kuehniella</i> <i>Etiella zinckenella</i> <i>Mussidia nigrivenella</i> <i>Paralipsa gularis</i>
stored vegetable products (including seeds)	<i>Plodia interpunctella</i> <i>Elasmopalpus lignosellus</i> <i>Ostrinia nubilalis</i> <i>Ancylostoma stercorea</i> <i>Corcyra cephalonica</i> <i>Elasmopalpus lignosellus</i>
strawberries [<i>Fragaria</i>]	<i>Etiella zinckenella</i> <i>Maruca vitrata</i> <i>Ostrinia nubilalis</i>
string beans [<i>Phaseolus vulgaris</i>]	

Table 2. Continued.

Hosts	Pyraloid Species
<i>Strobilanthes</i>	<i>Herpetogramma bipunctalis</i> <i>Rhectocraspeda periusalis</i>
sugar beets (see beets) sugarcane [<i>Saccharum officinarum</i>]	<i>Cadra figulilella</i> <i>Chilo suppressalis</i> <i>Diatraea</i> <i>Elasmopalpus lignosellus</i>
sunflower [<i>Helianthus annuus</i>] sweet cherry [<i>Prunus avium</i>]	<i>Eoreuma loftini</i> <i>Homoeosoma electellum</i> <i>Cadra cautella</i> <i>Cadra figulilella</i> <i>Ectomyelois ceratoniae</i> <i>Plodia interpunctella</i>
sweet potato [<i>Ipomoea batatas</i>]	<i>Megastes</i> <i>Udea rubigalis</i>
<i>Swietenia</i> (see mahogany) swiss chard <i>Syzygium malaccense</i> (see rose or Malay apple) tamarind [<i>Tamarindus indica</i>]	<i>Spoladea recurvalis</i> <i>Amyelois transtilla</i> <i>Cadra cautella</i> <i>Ectomyelois ceratoniae</i> <i>Phidotracha erigens</i>
<i>Tamarindus indica</i> (see tamarind) tamarisk [<i>Tamarix</i>] <i>Tamarix</i> (see tamarisk) tea [<i>Camellia sinensis</i>] <i>Theobroma cacao</i> (see cacao) thyme	<i>Cryptoblabes</i> <i>Plodia interpunctella</i> <i>Diaphania indica</i> complex <i>Pyrausta</i> <i>Pyrausta</i>
<i>Thymus</i> <i>Thymus vulgaris</i> (see thyme) tomatillo [<i>Physalis ixocarpa</i>] tomatoes [<i>Lycopersicon esculentum</i> (= <i>L. lycopersicon</i>)]	<i>Lineodes integra</i> <i>Chilo suppressalis</i> <i>Leucinodes orbonalis</i> <i>Lineodes integra</i> <i>Neoleucinodes elegantalis</i> <i>Ostrinia nubilalis</i> <i>Rhectocraspeda periusalis</i> <i>Herpetogramma bipunctalis</i>
tossa jute [<i>Corchorus olitorius</i>] <i>Trifolium</i> (see clover) <i>Triticum</i> (see wheat) <i>Tropaeolum majus</i> (see nasturtium) tuberose [<i>Polyanthus tuberosa</i>] turkey berry [<i>Solanum torvum</i>]	<i>Hendecasis duplifascialis</i> <i>Lineodes integra</i> <i>Neoleucinodes elegantalis</i> <i>Hellula phidilealis</i> <i>Hellula rogatalis</i>
<i>Typha latifolia</i> (see cat-tail) upland cotton [<i>Gossypium hirsutum</i>] <i>Vaccinium</i> <i>Vallisneria</i> vegetable (rotting)/fungus <i>Vicia faba</i> (see broad bean) <i>Vigna</i>	<i>Paralipsa gularis</i> <i>Cadra cautella</i> <i>Parapoynx</i> <i>Aglossa caprealis</i> <i>Maruca vitrata</i> <i>Trachylepidia fructicassiala</i>

Table 2. Continued.

Hosts	Pyriloid Species
<i>Vigna unguiculata</i> (see cow peas)	
<i>Vitis</i> (see grapes, raisins)	
<i>Vitis vinifera</i> (see wine grape)	
walnuts [<i>Juglans</i>]	<i>Amyelois transtilla</i>
watercress [<i>Rorippa</i>]	<i>Evergestis rimosalis</i>
water-lettuce [<i>Pista stratiotes</i>]	<i>Schoenobiinae</i>
watermelon [<i>Citrullus lanatus</i>]	<i>Pyrausta</i>
wheat [<i>Triticum</i>]	<i>Chilo suppressalis</i>
	<i>Corcyra cephalonica</i>
	<i>Ostrinia nubilalis</i>
	<i>Hellula phidilealis</i>
	<i>Cadra calidella</i>
	<i>Paralipsa gularis</i>
	<i>Herpetogramma bipunctalis</i>
	<i>Spoladea recurvalis</i>
white chard [<i>Beta vulgaris</i>]	
wine grape [<i>Vitis vinifera</i>]	
<i>Xanthosoma braziliense</i>	
<i>Zea mays</i> (see corn)	
<i>Zingiber</i>	<i>Phidotricha erigens</i>
<i>Ziziphus jujuba</i> (see jujube)	

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